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VOL. LXXXV

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NO. 1488



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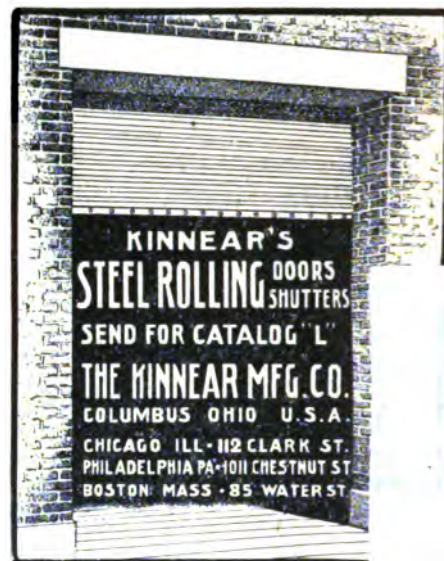
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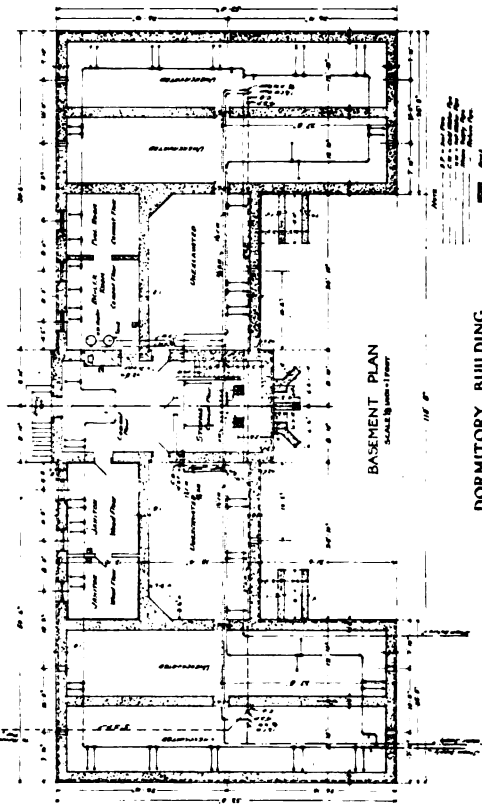
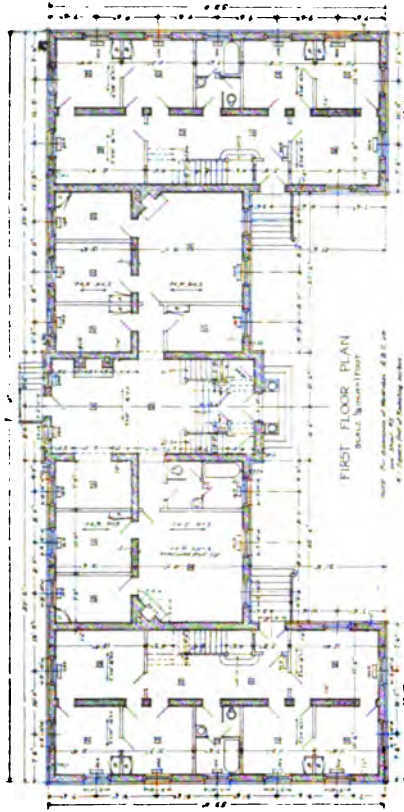


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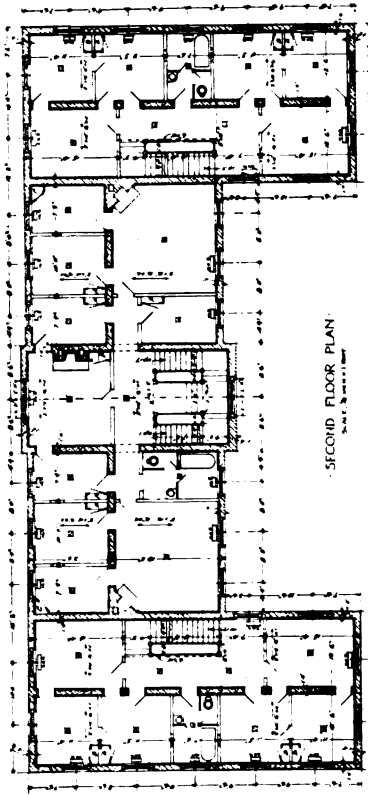
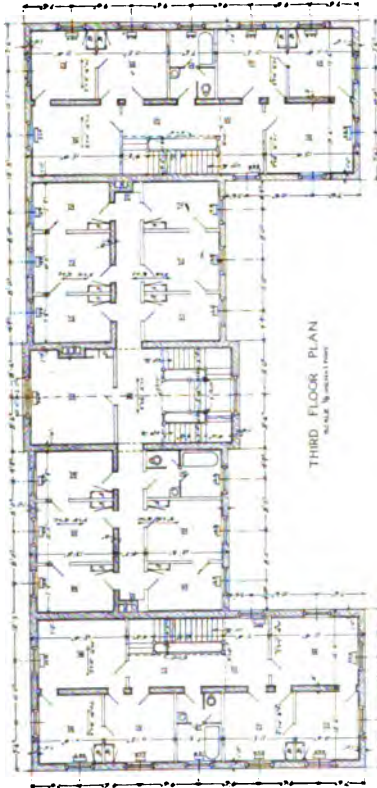


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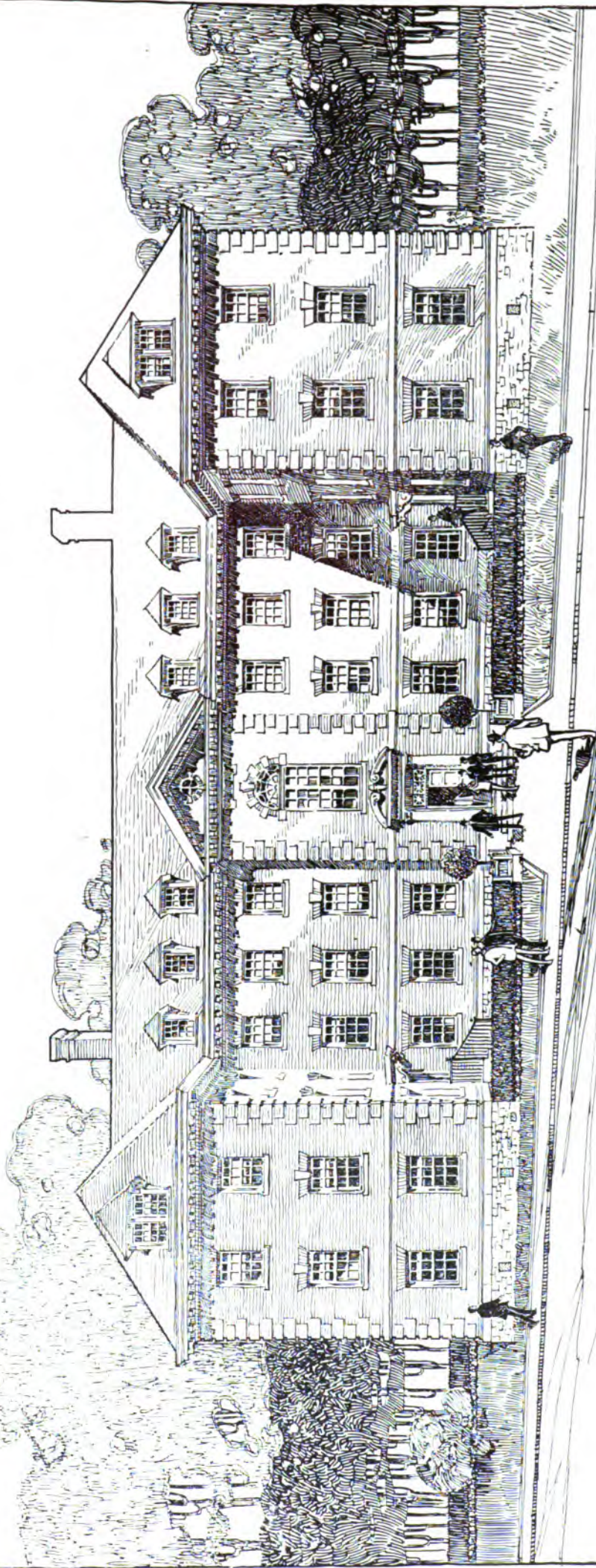
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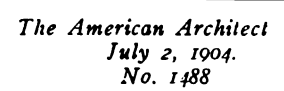
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July 2, 1904.  
No. 1488















# THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. LXXXV

SATURDAY, JULY 2, 1904

No. 1488

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it is just as well to let the affair pass as merely a local matter. This attitude would be very unfortunate for the financial outcome, but it is not the only misfortune that already attaches to the Fair. The wrecking of a bull-ring by a mob was not exactly a good advertisement and the recent order that the Exposition guards shall arm themselves with slung-shots is another warning that visitors to St. Louis this summer may expect exciting experiences before they get away from the town. Moreover, there have already occurred two or three fires in the smaller buildings within the grounds, fires, fortunately, that the excellent fire-fighting arrangements prevented from attaining dangerous proportions.

IN New York and some other cities it is the law that no contract for city work that will cost over one thousand dollars shall be awarded except after public advertisement, so that the city may have the benefit of the lowest bid. The regulation is sensible enough, although it has frequently impelled heads of departments to devise devious means, in the way, principally, of splitting up the work, by which the job could be given to a favored henchman of the municipal administration. This same principle is now being used in Kansas City to take a contract away from a Democrat, the present administration being Republican—for in the game of politics one excuse is as good as another. The case is interesting simply because the Republican mayor argues that the contract in excess of one thousand dollars that has been awarded is the five per cent fee which the city at present stands pledged to pay Mr. F. C. Gunn for his services as architect of the new city hospital. It appears that the design for the hospital was secured from Mr. Gunn direct and without competition or advertisement of any kind, and the Mayor argues that as his five per cent commission will amount to twelve thousand dollars or so, it is clear that a contract has been awarded to him in excess of the one thousand dollar limit and, so, in violation of the law. The point is curious and may be well taken; at any rate it points out one more matter for architects to be careful about in their dealings with public authorities.

WHATEVER the theory under which the managers of the Louisiana Purchase Exposition have acted in seemingly denying to the architects who designed the buildings the credit before the public which is certainly their due, it has just been abandoned, and they have announced that the names of the architects will now be attached to the buildings on tablets legibly inscribed with large gilded letters. This, if properly done, will, though somewhat belated, be well enough, but we do not think it will meet the situation in the best way. What, we believe, has excited, and justly, the indignation of the architects is the extraordinary pains the "Department of Publicity" seems to have taken not to attach the names of the architects to the innumerable photographs and electrotypes of the buildings that it has issued to the public press. The authorities should know that they were able to secure architectural service at bargain-counter rates largely because the architects counted on future returns from their greatly extended reputation as designers of the several Fair buildings; and to have this legitimate advertising denied to them by the practice of the Department of Publicity looks very much like the breach of an implied contract. In the case of any future fairs, architects will do well to make it a stated condition of their agreement that their names shall be attached to all illustrating documents put out by the promoters of the undertaking.

THERE seems to be, as yet, very little interest taken in the St. Louis Fair, if we may judge by the paucity of information concerning it which is to be found in the daily papers, a scarcity so marked as to cause one to suspect that the authorities may have done something to lead the newspaper managers to feel that

ON the other hand, a city seems not always to be able to be the mistress of its own economies. Trenton, N. J., recently appointed a school architect to do certain architectural work of a generally routine character. During his term of office he was asked to prepare plans and specifications for a high-school building, although work of this particular kind seems not to have been particularized in the terms of his engagement; but the city fathers evidently could not understand what an official architect was for unless he did all the architectural work the city wished to have done. The architect obligingly did what he was asked to do, and then presented a claim upon the city for seven thousand five hundred dollars in excess of the annual salary. Naturally the claim was protested, but the Supreme Court has recently decided that the city must pay it.

Downward ventilation has been termed "down draught," apparently in the hope of condemning it by giving it a bad name. Advocates of the open fire have stated that to propel air into the upper portion of a room and let it go out from the lower portion is unnatural. Fortunately this can be easily disproved. Take an ordinary room with an ordinary open fire and smoke flue. Test it as you will, and, apart from occasional strong winds setting up adverse currents, resulting at times in what are termed "smoky chimneys," it will be found that the only detectable outgoing of air takes place by the open-fireplace flue, the lower opening of which is about two feet six inches above the floor level. Many people open the upper portion of a window when the temperature of a room, heated by an open fire, is excessive, holding the idea that they are letting out the hot air; but with rare exceptions the temperature of the room is then actually lowered by letting in a larger volume of colder air, which compels a more rapid outgoing of heated air up the flue.

It is true that in most cases no special inlet for air is provided, and that in consequence air enters by any casual, and probably dirt-concealing holes, cracks, and crevices—mostly around the lower portion of the room—whence it makes its way in narrow streams, moving with considerable velocity towards the fireplace, causing unpleasant draughts, while little change of air takes place in the upper portion of the room. Yet, if the same room were provided with a suitable inlet at a foot or two below the ceiling, on the same side as the fireplace and as central thereto as may be, the incoming air would become tempered by contact with the ceiling, walls, furniture, etc.—previously warmed by radiant heat from the fire—it would, by its inflow, force the atmosphere of the room downwards towards the fireplace opening and up the flue to the open, without causing discomfort to occupants.<sup>1</sup> Under these conditions air is propelled into the room from a reasonable elevation, where it is generally fresher than near the ground level and more free from chance contamination. Force of wind outside, varying as it does in intensity, will materially affect velocity of change within. I have therefore devised a simple automatic regulating inlet, consisting of a curved enclosure to a resistless flap hung eccentrically so that the area of the inlet opening is diminished proportionately to the force of wind playing against it; but satisfactory results can be obtained even without this refinement, if the inlet be provided with louvres for distributing the air at low velocity. I am perfectly aware it is not the method usually adopted, nor is it the one recommended in most works on ventilation. Do not, however, condemn it without proper trial; think it out, and you will, I believe, come to the conclusion, as by practical experience I have, that it is most effective in securing the efficient ventilation of an apartment; and if so, then the relative positions advocated for inlets and outlets with the "plenum" system are correct.

Complaints being so frequent of defective ventilation—even in buildings where outlay has been incurred in the expectation of securing, let us say, comfortable ventilation by natural means—is it surprising, when we consider the marvellous results of mechanical power, now used for the benefit of mankind in almost numberless ways, that attempts should be made to employ it for improving the ventilation of buildings?

Mining operations and many occupations have for years been carried on which would have been impossible without the assistance of ventilation brought about by mechanical means. Thousands of power-driven rotary fans and air-propellers are in daily use, proving the possibility of changing the air of enclosed spaces. Centuries ago the necessity for securing greater change of air within buildings than could at all times be naturally procured was recognized, and a few advanced minds suggested the employment of bellows and other primitive appliances worked by hand or water power. I have seen quaintly illustrated treatises on the subject; and although failure doubtless resulted from inadequate knowledge and appliances, there is no reason why, with air-propellers and power appliances brought to the high state of perfection they are to-day, we should not take advantage of them for securing ventilation within buildings.

It is no argument to say, "I don't like plenum ventilation," or even to point to failures which have occurred; nor is it sufficient to bring forward some fanciful idea that in an undefined manner air moved by mechanical power is deprived of an unknown vital essence. It has been suggested that by warming air otherwise than by the sun's rays this intangible essence is destroyed, and that is given as a reason why some people condemn plenum

ventilation; but it is altogether begging the question, because in summer time, when "plenum" ventilation is so effective in maintaining a cooler atmosphere within doors than in the open, no heating is employed. Will it then be contended that, by lowering the temperature, such will-o'-the-wisp essence again disappears? Unfortunately my scientific knowledge is not sufficiently profound to enable me to determine if there is even an element of truth in these imaginings; but even if there be, which I strongly doubt, it is easy to demonstrate that with a carefully devised installation of "plenum" ventilation the necessary warming and cooling of air are effected with less chance of deterioration than by any other method. In addition to which the air is drawn from sources known to be at a distance from contamination; it can be cleansed from suspended impurities, brought to suitable hygrometric condition, and passed on to apartments without contact with impurity.

I am, perhaps, as painfully conscious as anyone that there have been many failures with "plenum," and so there have been with every other method employed for securing ventilation; but my experience convinces me that failure is not the fault of the system, but that it results either from want of knowledge and experience on the part of those who installed it, or from neglect. It is only by careful comparison of results and a minute examination of the means and methods employed that a true estimate of its value can be ascertained. Personally I have not the faintest doubt that by the "plenum" system the efficient ventilation of a building can be effected. The principle is perfectly sound; yet I realize there are two sets of objections to be met: the first I class as purely fanciful, most of which I have already dealt with; the second are more tangible, and relate to the means and appliances which should be employed and the cost. To review all the means and appliances at disposal is quite out of the question on the present occasion, but they have a very decided influence, not only as regards partial or complete success, but also a direct bearing on the question of first cost and maintenance.

Much as I dislike making comparison between the work of others and that with which I have been connected, this discussion has been forced on, and we are to meet in the hope of gaining instruction which may be placed at the service of the public. Consequently I shall briefly compare, principally as regards costs of power employed, a few installations of plenum ventilation, and as I shall make use of information derived from printed particulars given by the engineers themselves, we shall at least have fairly reliable data.

Building.	Cubic feet of air per hour.	Change of air per hour.	Power.	Estimated horse-power.	Annual cost for power.	Annual cost per million cubic feet.
Glasgow, Art Galleries.....	9,050,000	Not stated, probably 3 times	Electricity	66	*£2,695	£298
Manchester, Technical School.....	12,000,000	3 1-2 times	"	80	3,224	269
Manchester, Midland Hotel.....	6,000,000	3 times	"	40	1,612	269
Birmingham, General Hospital.....	13,000,000	7 "	"	19	766	59
Belfast, Royal Victoria Hospital.....	5,000,000	7 "	Steam	5 1-4	100	20

Consider the importance of such a comparison as regards the number of changes of air effected per hour. May not success in great part depend upon giving an adequate change of air? And surely the question of cost would be a determining factor in many cases.

Reference to the paper by Mr. Henry Lea given in the *Institute Journal* for December 10, 1903, will show how this economy in cost of power is effected. In the discussion which followed Sir John C. Holder personally testified to the success of plenum ventilation in the General Hospital, Birmingham, which he has systematically visited, one may say almost daily, during and since its erection, and I could produce a large number of letters addressed to me containing congratulations on the satisfactory ventilation of that and the Royal Victoria Hospital, Belfast; but I prefer to place before you one because it was not written to me,

<sup>1</sup> See article on "Ventilation" in "Modern House Construction," Vol V. Blackie & Son, Ltd 1899.

\* The costs of running are worked out proportionately to the amount of power presuming it is employed continuously.

and because it is from an architect experienced in hospital design, viz., Mr. Batchelor, of Messrs. Carroll and Batchelor, of Dublin, neither of whom is personally known to me. It runs thus:—

"I had been greatly interested in the accounts I read from time to time of the progress of the Royal Victoria Hospital, Belfast, and more particularly in the arrangements for heating and ventilating it. I have had some experience of the plenum system, and have never been much in love with it. I looked therefore rather with distrust on a building which had been so designed as to make such a system obligatory. Mr. Henman is to be complimented and congratulated on his courage in designing such a hospital, and I am free to confess that the result, so far as I was able to judge during my short visit, affords him ample justification for his inversion of many of the accepted canons in hospital design. I was particularly struck by the wonderful uniformity of the temperature maintained in the hospital throughout the twenty-four hours—such as could not, I believe, be obtained by natural means. The freshness of the air in the wards was remarkable, and there was a complete absence of that peculiar odor which is familiar to everyone having to do with hospitals. These results are obtained, I was glad to see, without draught, nor was there any perceptible movement of air in the wards. Everywhere I went through the hospital I saw evidence of great forethought and skill in design, particularly in those small details which count for so much in the economical administration of the institution. The building is a credit to the architects and also to the contractors, who have put such honest and—if I may use the expression—sympathetic work into it. Everything appears to have been done as well as it was possible to do it."

It has been well said that the only way to arrive at a right judgment as to the practical utility of plenum ventilation is to carefully examine it in a building in which it has been applied with knowledge and experience. All I ask, in conclusion, is that the subject may be approached without prejudice or regard to merely personal interests and fanciful misgivings, for a right understanding by the architectural profession on the subject of ventilation must have a vital influence on the health and well-being of the people.

#### ARCHITECTURE AT THE EXPOSITION.<sup>1</sup>

THE Centennial and the Columbian Expositions, the two Fairs of international importance thus far held in the United States, were epoch-making in our architectural history. The Centennial in 1876 gave the first impulse to the revival of taste and interest in architecture since English influence ceased to be felt in the early days of our national existence. By the year 1893 some good architectural work was being done, but it remained for the beautiful Court of Honor at Chicago to arouse public interest thoroughly and stimulate architectural practitioners as a body. The enthusiasm thus awakened has not abated. On the contrary, the general appreciation of good architecture has greatly increased, and correspondingly greater demands are made upon the architect. These demands require in him a more careful education and training and inspire him to his best efforts. As a result, professional standards have been raised to higher levels during the last decade. In these various signs many are reading a prophecy of an era of still greater progress. It would almost seem that it but remained for the Louisiana Purchase Exposition to give a third impulse to American architecture, the results of which should bring about an architectural period noteworthy in history. . . .

The general architectural plan is familiar to the reader. It was determined by the natural ridge of ground, now named Art Hill, which was an obvious position for the focal point. An axis perpendicular to the general direction of this ridge was then the natural axis of the composition. It would follow that buildings which could not be grouped about this main axis would be placed upon another running transversely to it. On account of the boundaries of the site this axis could not be made straight. This is not necessarily unfortunate in a transverse axis. Had it taken the form of a long, sweeping curve instead of an abruptly broken line, a perspective effect of great beauty would have been obtained, and the continuity of the avenue made evident. The existing breaks confuse the beholder, and give the effect of a sudden termination rather than a mere

change in direction of an extended avenue. This may be cited as one of the lost opportunities to impress upon the visitor the great extent of area to which the Exposition may lay claim.

The natural ridge of Art Hill, with its long sloping approaches, formed a rare site for the culminating point of the main composition. The group of buildings upon the hill, Festival Hall, Colonnade of States and the Restaurant Pavilions, together with the Cascades and the extensive slope, as a whole form a fine monumental conception. In this hill Nature bestowed a favor that has not before been granted to the designers of expositions. But lest they should grow too exultant she turned the hill to the north so that, save in the early morning, the great group of buildings crowning Art Hill, instead of forming the brilliant point of the composition, remains a shadowy mass. This is undeniably a misfortune. It is also to be regretted that the costly and well-designed Art Building should be cut out and wasted as an effective element in the architectural grouping.

Effective as is the stupendous group of buildings on Art Hill, there seems to the writer to be too great a lack of continuity between it and the buildings on either side of the Grand Basin. There is but one point from which the main court appears to be a unit. That point is the boat-landing directly in front of the Louisiana Monument. From other points of view a wide gap separates the buildings of the lower and higher levels. Within the fixed limits of the Court of Honor the task imposed upon the designer was to emphasize the length of the vista, and, with the fortunate site for the main point upon an elevated ridge, to accentuate the height of the hill. The shape of the Grand Basin is a semi-circle joined to an elongated rectangle, the semi-circle, whose diameter is about twice the width of the rectangle, being at the farther end from the most advantageous viewpoint. This sudden expansion in width undoubtedly acts in opposition to the perspective effect of distance. The optical effect of the parallel sides of a rectangle seen in perspective is an apparent contraction at the farther end. Obviously a real contraction would enhance the effect of distance, and on the other hand an expansion would annul this effect. Hence the vast area of the half circle at the end of the rectangle is not realized; and yet because of its area and location it tends to dwarf the apparent size of the rectangle and to shorten the apparent length of the main vista. This arrangement of two groups of buildings, one upon a lower and the other upon a higher level, decidedly removed from the first with no connection between, tends by reason of perspective effects to diminish the apparent height of the higher of these groups. The absence of any connecting feature to carry the eye from one group to the other renders it difficult to realize the actual distance between them and compare their respective heights.

Had the Colonnade of States been arranged to form continuous lines with the court facades of the Electricity Building on the one side of the Grand Basin and the Education Building on the other, the true effect of the distance from the plain to the summit of Art Hill would not have been lost. The elongated rectangular form thus given to the Court of Honor would have greatly augmented the apparent length of the vista; while the long lines of colonnades sweeping up the slope would have emphasized the altitude of the hill, and brought out to its full value the height of the great dome of Festival Hall. . . .

The buildings of the Fair are of uniform height and color, but beyond this individual fancy has run riot. The limitation of style, if it may be called a limitation, which was imposed upon the designers was the use of "free renaissance." A common understanding as to what interpretation should be placed upon this limitation was evidently lacking, and a certain impression of discord results. The varied designs express, no doubt, the ideas of the different designers as to what exposition architecture should be. The material used, as well as the purpose for which a building is intended, determine the character of its design. The festive and ephemeral nature of exposition architecture tends to loosen the bonds of restraint which should be felt in designing a permanent structure. Staff, the material employed in these buildings, is a light plastic substance, admirably adapted to rich and elaborated decorative forms. An architecture true to the nature of this material should observe its limitations of strength. It can not logically be used in structural forms primarily designed to be built of stone which, unlike staff, is capable of sustaining great weight. In sham stone architecture, then, we can scarcely expect to find all of the Seven Lamps of Architecture burning brightly. Its beauty must be somewhat

<sup>1</sup> Extracts from a paper by Mr. Frederick M. Mann in the *Bulletin of the Washington University Association*.

dimmed by the absence of the flame of truth. This type of architecture, however, has come to be considered legitimate, in this country at least, in exposition building, and until our cities are more replete with permanent structures of fine monumental character, we may perhaps be pardoned, as a people, for our fondness for such creations in plaster when an exposition presents the opportunity to build them.

Festival Hall, together with the Colonnade of States and Restaurant Pavilions, form a consistent group. Scarcely any other work on the grounds approaches this group in quality and strength of design. We consider, however, the lack of connection between the Colonnade and the Pavilions to be a fault. The Restaurant Pavilions, though comparatively modest in size, are exceedingly attractive in composition. The form of their domes, however, seems to be too little harmonious with that of Festival Hall. Their ornament is well disposed, admirably filling its place and in excellent scale. These small buildings show the results of careful study and may be ranked among the most successful. The design of the Colonnade of States is also skilful and interesting. If its shadowy mass could have been arranged to be seen against the sky, a fine effect would have been gained. Deprived of sunlight by its northern exposure it needed a brilliant rather than its present sombre background. Whatever may be lost in the daytime, however, will doubtless be fully retrieved at night under the transforming influence of myriads of electric lights.

The evident lack of sympathy between the designs of the various buildings is nowhere more apparent than in the case of the group on Art Hill and the facades surrounding the Court of Honor. These two groups seem to belong to two distinct and separate species, as it were. The balance of stronger qualities is perhaps with the group on the Hill. The heavy though decorative architecture of the time of Louis XVI marks this group, while one finds around the rectangle below the lighter Italian influence predominating. Of the four facades about the Court of Honor, that of the Manufacturers' Building would seem to be the most worthy of note. Its skilful and spirited design shows an evident appreciation of the free, decorative character of exposition architecture. Its colonnade, if we must accept stone columns in plaster, is by far the finest on the grounds. The columns are heavier than the usual proportion for stone columns, and this undoubtedly gives a sense of adequacy for its purpose to a column of weaker material. The intercolumniation also is fine. An instructive comparison may be made by glancing across to the colonnades of the Varied Industries and the Education Buildings, neither of which is so well proportioned nor so vigorous in detail. The Education Building as a design, however, is open to little criticism. Its chief fault may be said to consist in its somewhat too serious character both for its material and its purpose as an exposition building. The facade of the Electricity Building, on the other hand, can scarcely be called successful. Its lines and masses are too much broken to give a feeling of repose. This is equally true of the Machinery Building, the detail of which is open to almost sweeping condemnation. Its heavy imitation stone trimmings—imitation even to exaggerated marks of the stone-cutter's tool—sink well nigh to absurdity. The use of a sham clock-face with plaster figures and hands as an ornament over the main entrance scarcely denotes inventive fertility in design. As if in rebuke, one of the finest groups of decorative sculpture, among many fine ones at the Exposition, is to be found as the crowning feature of this entrance directly above this futile time-piece. The Transportation Building may be counted among the successful designs. It has some exceptionally well designed and skilfully executed ornament. The slender towers at the ends of the facade seem to be too high and at the same time not sufficiently massive to fulfill adequately their combined function of terminating the sky line and serving as crowning features to the heavy end piers. The plainness of the sides of the building, acting as a foil to the rich end facades, is a very acceptable relief.

It is a serious question whether in the design of this exposition as a whole sufficient recognition has been given to the value of such plain spaces. With their proper and desirable use a considerable sum might have been saved and directed not only to the concentration of richness at focal points, with a consequent relief to senses overpowered by a constant bewilderment of effects, but also to the adequate termination of incomplete vistas and other similar omissions which are at present much to be regretted.

The Mines and Metallurgy Building is both original and interesting. Perhaps it is more out of sympathy with most of the other buildings than they are with each other; but a frank difference is almost always preferable to a slight discord. In this respect the designer's somewhat radical departure may be counted to his credit. The building lacks scale, and its central motives, with crowning globe and flanking obelisks, are not entirely satisfactory; but as a whole and in many details it is of great interest. It was evidently designed for a rich color treatment, which it apparently is not to receive. This leads one to wonder at the general absence of color treatment, the cheapest and most effective agent that could have been employed to unify the whole architectural scheme, rendering it brilliantly festive and at the same time more restful to the eye than a desert-like monotony of universal monochrome.

The United States Government Building occupies a fine site, but is badly dwarfed by the colossal exhibition buildings flanking the avenue leading to it. The elaborate sweeping ramps forming a main part of its approaches are somewhat superfluous, being entirely lost to view behind the big buildings in front of it. The little building of the United States Fish Commission has much charm and interest, considerably more, in fact, than the main Government building itself. It appears upon first glance to be of pure Greek inspiration, but an examination reveals that it is not archaeological in the least, but full of charmingly original detail.

#### PROPERTY RIGHTS UNDER THE CONSTITUTION.<sup>1</sup>

IN this case John T. Underhill sought an injunction in the Circuit Court of Kenton County, Ky., against Walter Murphy and others. Underhill was an employing plumber, and had been engaged in the business in Covington, Ky., for a number of years and had built up a profitable trade. He had on hand at the time of the trouble giving rise to this action a number of important contracts. His workmen were members of a labor union, and, a difference having arisen between Underhill and his employees, they left his service. Underhill then employed non-union men to assist him in carrying out his contracts, whereupon his former employees instituted measures to break up his business by the use of threats, intimidation, force and violence, all of which was pleaded and sufficiently proved, it appearing that not only was the plaintiff's place of business picketed, but that actual assaults had been made and the assistance of the police had been required at different times to safeguard Underhill and his workmen. The court stated that "the proof shows a determined effort by conspiracy on the part of the defendants to break up and destroy the plaintiff's business by force and violence unless he acceded to the demands of the union to which they belonged." The prayer for an injunction had been denied in the court below (see Bulletin of the Department of Labor No. 37, p. 1203), from which judgment Underhill appealed to the Court of Appeals and obtained a reversal, the granting of an injunction being directed. The following selections from the remarks of Judge Hobson, who delivered the opinion of the court, set forth the grounds of the court's action:—

WHEN a man has, by years of toil and fair dealing with his customers, built up a valuable business and good will, he is as much entitled to protection by the law in this species of property as in the home that shelters him, or the coat that protects him from the winter's cold. The right of the plaintiff to carry on his business and to carry out the contracts which he had made was a valuable property right, and no less intrinsically property than if the same amount of money had been invested in a stock of merchandise or a city lot. If the defendants had conspired together by force and violence to burn up the merchandise, or to carry off the surface of the lot, upon elementary principles, the chancellor would protect the plaintiff from the destruction of his property. The acts of the defendant as truly destroyed the plaintiff's property when they broke up his business by force and intimidation as they would have done in the case of visible property by burning it or carrying it off. Among the inalienable rights which by the first section of the State constitution are guaranteed as inherent in all men is "the right of acquiring and protecting property." The right to acquire and protect property

<sup>1</sup> Injunction — Stalkes — Criminal Law — Bonds to Keep Peace — Property Rights — Adequate Remedy — *Underhill vs. Murphy et al.*, Court of Appeals of Kentucky, 78 *Southwestern Reporter*, page 482.

is as sacred in the case of intangible property as tangible, and an injunction may be granted to protect intangible rights no less than those that are tangible.

The learned circuit judge refused to interfere on the ground that the acts committed by the defendants are criminal in nature, and punishable by the police department; that, if he had jurisdiction to enjoin the commission of the acts, it necessarily followed that he had jurisdiction to enforce a penalty for a violation of his order; and that this would amount, in substance, to holding that he could try and convict the defendants for a criminal act without the intervention of a jury. We cannot concur in this reasoning. If the defendants were undermining the plaintiff's house, or about to slide it with his family in it into the Ohio River, an injunction would not be refused on the idea that, if they thus drowned any of the people in the house, they might be punished for murder, or, if they destroyed the house only, they might be indicted under the statute for the wilful destruction of private property. The reason is plain: The punishment of the defendants for murder or for the destruction of the house, while it would vindicate the majesty of the law, would not help the plaintiff in any way. To relegate him to the processes of the criminal law is to allow his property to be destroyed, and to give him no remedy therefor but the satisfaction of seeing the wrongdoers punished. The inherent and inalienable right of acquiring and protecting property which is guaranteed by the constitution means nothing if it means only this. If a man must stand by and see his property destroyed, and has no remedy but the slow process of the criminal law, which only punishes the offender, but restores nothing to him, then the constitutional guaranty of the enjoyment of life, liberty and property under the law is a meaningless generality. If, in this case, the defendants are fined in the police court, this will not restore to the plaintiff the loss he has sustained by reason of the interruption of his business and his consequent inability to carry out his contracts. When his customers are driven away, and the good will of his business is destroyed, it will be too late, so far as he is concerned, for the punishment of the appellees by the criminal law to re-establish his ruined business, or even prevent future loss. If the Circuit Court had granted the injunction, and the defendants had disobeyed it, and he had punished them for contempt, the punishment would have been for their disobedience of the order of the court, regardless of whether their acts were also a violation of the criminal law of the land for which they might be indicted and punished in the criminal court. His judgment punishing them for contempt would have been no bar to the criminal proceeding against them for their violation of the law, and would not have affected this proceeding in any way. His judgment would have established nothing more than that they were guilty of contempt of court in disobeying his orders. Whether they were also guilty of a criminal offense would have to be tried in the proper forum, and not in this action. The power of a court to punish for contempt is as old as the common law, and inherent in every court. The punishment for contempt would relate only to acts done after the injunction was granted, in disobedience of it; and even in this proceeding the defendants are protected as to a jury trial by section 1291, Ky. St., 1903, which provides: "A court shall not for contempt impose upon the offender a fine exceeding thirty dollars (\$30), or imprison him exceeding thirty hours, without the intervention of a jury."

It is also urged that the plaintiff had an adequate remedy under the criminal code by having the defendants to give security to keep the peace and be of good behavior. The rule that an injunction will not be granted where there is an adequate remedy at law refers to legal remedies, and not to criminal proceedings. In no case has it ever been otherwise applied, so far as we can find. It looks to the prevention of offenses, and not to the redress of private wrongs. It is begun by a warrant issued in the name of the Commonwealth, and is a prosecution by the Commonwealth, under the control of its officers. If a bond is required, it is taken to the Commonwealth. When the plaintiff's property is about to be destroyed, he is entitled to a remedy in his own name, and which he can himself control to protect him in the enjoyment of his own. The fact that the Commonwealth might also take out a proceeding to require the defendant to give security for good behavior is immaterial, for both proceedings may be prosecuted at the same time—one in the criminal court by the Commonwealth, and the other in equity by the plaintiff; one to prevent the commission of offenses, the other to preserve the plaintiff's property from destruction.



WASHINGTON ARCHITECTURAL CLUB.

At a meeting of the Washington Architectural Club officers were chosen as follows: *President*, C. L. Harding; *Vice-president*, P. C. Adams; *Secretary*, Arthur M. Burt; *Treasurer*, J. H. Blohme; *Board of Directors*, Percy Ash, J. J. Bissegger, Louis A. Simon.

The travelling scholarship, value of \$250, money to be spent in travel and study in Europe, was awarded to H. Descum, a graduate of Cornell University Architecture School, and the second place to Fred V. Murphy. A special prize of \$100 was voted to Mr. Murphy by the club. Third place, to Milton Dana Morrill, and honorable mention to Eugene T. Parker.

The jury of award in the scholarship was made of the following architects: Glenn Brown, Arthur Brown, E. Frere Champuly, Theo. W. Pietsch, Percy Ash.

The prize membership to a student of the Columbian University architectural department was awarded to Chas. R. Lombard.

The prize membership to a student in the Washington Atelier to W. G. Noll.

CLEVELAND ARCHITECTURAL CLUB.

The Architectural Club at its annual meeting elected as *President*, Charles S. Schneider; *Vice-president*, Raymond S. Parsons; *Secretary*, Alex. Wolf; *Treasurer*, M. James Bowman; *Librarian*, Ralph M. Hulette; *Chairman Current Work Committee*, Stephen Gladwin; *Chairman Entertainment Committee*, Herman Kregelius.

The retiring officers made reports, and F. W. Striebinger, the retiring president, delivered an address. The club voted \$5 to the Mizer monument fund.



[Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.]

HOUSE OF HENRY G. HOWE, ESQ., LONGWOOD, MASS. MESSRS. PEABODY & STEARNS, ARCHITECTS, BOSTON, MASS.

ENTRANCE TO THE SAME.

DORMITORY BUILDING: WASHINGTON AND LEE UNIVERSITY, LEXINGTON, VA. MESSRS. B. C. FLOURNOY & PARKER P. FLOURNOY, JR., ARCHITECTS, WASHINGTON, D. C.

PLANS OF THE SAME.

DETAILS OF THE DOME OF STA. MARIA DI CARIGNANO, GENOA, ITALY: TWO PLATES.

These plates are copied from *Zeitschrift fur Bauwesen*.

Additional Illustrations in the International Edition.

ENTRANCE TO HOUSE OF C. A. HIGHT, ESQ., BROOKLINE, MASS. MR. GEORGE F. NEWTON, ARCHITECT, BOSTON, MASS.

THE NEW RATHAUS AT LINDEN, NEAR HANOVER, GERMANY. HERR EMIL SEYDEL, ARCHITECT.

This and the following plate are copied from *Blatter fur Architektur*.

CHURCH OF THE FORMER PHILIPPIN BROTHERHOOD, NEAR GOSTYN, PRUSSIA. XVII CENTURY WORK.

THE CHINESE GOVERNMENT BUILDING: LOUISIANA PURCHASE EXPOSITION, ST. LOUIS, MO.





[The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.]

### "BIG BEN."

BOSTON, MASS., June 24th, 1904.

TO THE EDITORS OF THE AMERICAN ARCHITECT:

Dear Sirs:—I have been very much interested in reading your article on Tower Clocks from the *London Mail*, but wish they had told us why that at Westminster was called "Big Ben." If you could tell us why and when it was called "Big Ben" I personally would be very much obliged to you. Very truly,

FREDERIC AMORY.

["BIG BEN" is said to have been named after one Benjamin Hall, an architect, though we are puzzled to guess what connection Mr. Hall had with the work of Sir Charles Barry that should entitle him to such tintinabulating fame. Even in the interesting libel suit brought against Sir Edmund Becket by the bell-founders—which may be found in our issues for July 23 and 30, 1881,—no explanation of the nickname is given.—EDS. AMERICAN ARCHITECT.]



A FRAGRANT REPORT.—"Aloes, civet, myrrh, and incense" are the fascinating subjects discussed in a report from Consul Masterson at Aden. It seems strange that such things should be regarded as mere articles of commerce, but so it is. Mr. Masterson says that Aden is the export market of these four substances, and that no other port can ever oust it. Of aloes Aden last year exported 31,696 pounds, nearly all of it going to London. Civet, which is one of the essential ingredients of nearly every high-grade perfume made, is taken from the pouch of the civet cat, an animal found in Abyssinia. The annual production of civet ranges from 250 to 300 pounds, and about half of this amount is shipped to New York. The price at Aden is from \$1.60 to \$3.24 an ounce, according to purity. Myrrh is principally used as an ingredient in incense, and the amount annually exported from Aden is about 1,344,000 pounds. A strange use of myrrh is made by the Abyssinian hunters, who smear their bodies with it before hunting elephants, in the belief that their quarry will not attack them on account of the smell.—*Portland Oregonian*.

COST OF PARIS SUBWAY DISASTER.—The disaster which occurred in the Paris "underground" less than a year ago has proved a costly matter for the Metropolitan Company, lessee of the line. Compensation cost close upon \$235,000 and loss of traffic amounted to over \$160,000. The total income of the railway for the year was \$3,530,000, and of this, under the terms of the concession granted by the Paris municipality, there has had to be handed over to the relief of the city rates the sum of \$1,140,000. Then after deducting the working expenses, which were in the neighborhood of \$1,500,000 (forty-two per cent. of the receipts), it was possible to give a dividend of about six per cent. The year has been one of great moment to the Paris Company in the matter of capital expenditure upon the new power station, the conversion of the system of electrically working the trams to multiple unit, etc., and a great deal of new rolling stock is now in course of building. The lighting and traction supplies are now effected by entirely separate circuits, so that in future the stoppage of a train through failure of the power circuit will not mean that there will be no light available—a matter which it will be remembered was one of the chief causes of the panic at Paris. The undertaking so far completed represents about twenty-two miles out of the twenty-six miles which constitute the first section. The new generating station, which is now almost ready, has a plant of about 20,000 horse power.—*Boston Transcript*.

TO KILL VIBRATION.—Making machinery foundations elastic so as to minimize or even altogether prevent vibration of buildings, is a recently much-mentioned subject, special references having been made to the uses of a particular new kind of impregnated foundation felt which is claimed to have given very satisfactory results. It has been spoken of as intended chiefly for insertion beneath rails, girders and machine beds, and as being made in

sheets of varying thickness—from  $\frac{3}{8}$ -inch to  $1\frac{1}{2}$ -inch. The felt is impregnated with mineral fat, so as to be moisture-proof. In Germany it is said to be in extensive use in connection with steam-hammers, pumps, steam-engines and much other machinery; under bridge girders, railway ties, rail chairs, and car bodies; and between columns and joists in buildings, and on shipboard to separate machinery from steel decks and bulkheads. The sheets are made in different sizes up to sixty inches in length by thirty inches in width. Felt mats have for many years been used in anti-vibration expedients, so that there is ample reason to expect satisfaction from the employment of the so-called "foundation felt" here noted; but it may not be amiss to observe that in many instances the apparent desirability of its use is indicative simply of something wrong in the machinery installation. Small earthquakes from the operation of a steam-hammer, and trembling buildings from fast-running machinery, often are proofs that the machinery has not been properly put in. Foundations rightly proportioned and rightly laid would materially restrict the market for special foundation preparations and confine their use to the underlaying of rail chairs, bridge girders and such other more appropriate things as have already been mentioned in the above remarks. With these their services would seem to have a fitness entirely lacking where moving machinery is concerned.—*Cassier's Magazine*.

A LIGHTNING DEMONSTRATION.—Recently Sir Oliver Lodge gave at the Institute of Architects, to the members of the Lightning Research Committee and some others interested in the subject, a practical demonstration of the action of lightning, more especially as regarded lightning conductors. The electrically charged cloud was represented by a thin sheet of metal mounted on non-conducting standards charged from a battery at pleasure, and placed in a position sloping downwards from front to back, so that the model lightning conductors could have their points brought nearer to or further from the under surface of the "cloud" by shifting their positions on the table. Some of Sir Oliver's conclusions were much at variance with what are popularly accepted. He placed in operation successively conductors of three different substances—copper, iron and wet string. The copper was the most intense and rapid conductor, producing a sharp crack at the flash; the iron took it with less noise, the wet string with hardly any, yet it was efficient in protecting the two other conductors. Wet string is of course impossible in practice (the thunder-shower performs some of its function, however, in relieving pressure), but Sir Oliver maintained that iron was quite as efficient a conductor as copper—and more, that the intensity of action of copper was more likely than iron to set up side-flash, which, in protected buildings, has been the origin of most lightning accidents. Sir Oliver also illustrated and described his classification of lightning into two kinds, which he called "A-flash" and "B-flash." The former was the normal discharge of lightning from an overcharged cloud direct to earth; the B-flash occurred when a large cloud discharged into a smaller one, generally though not necessarily below it, which was overcharged suddenly and discharged to earth with great violence. Sir Oliver Lodge proceeded to show, by several illustrations, why the B-flash might be expected to be more sudden and intense than the A-flash, and proportionately more difficult to protect against, though he would not say that all lightning injuries had resulted from B-flashes. The practical outcome of the demonstration was that a building should have as many points of protection as possible, and that (if we accept Sir Oliver's teaching) the copper lightning conductor is dismissed with costs.—*The Builder*.

CAPSTAN UNEARTHED IN FORUM.—Giacomo Boni, the archaeologist, who is directing the excavations of the Forum, has found a heavy capstan, with eight fixed levers of wood. The wood is perfectly preserved, while the iron fixtures have become oxidized. This discovery is considered of the greatest importance, as being the first known mechanical contrivance dating back 2,000 years. The capstan, which was found almost intact, is over six feet in diameter. Signor Boni has ordered the capstan covered with a special preparation to preserve the wood.—*Exchange*.

A ROOF-GARDEN ON A PACKING-HOUSE.—A novel thing about a new structure to be built for a bacon and ham packing firm in Cincinnati will be a large roof-garden. There will be a lake, oval in shape, 25x30 feet in dimension, with fishes in it. In the centre of this lake will be a small electric fountain. The lake will be from eighteen inches to two feet in depth. Besides the lake there will be regular grass plots, with trees planted in them and such flowers as thrive in this climate. The height of this garden from the street will be between 75 and 80 feet. In the summer time the place will be covered over with awnings, and everything arranged so that it can be used by the members of the firm, their employees and the business men of that locality as a pleasure resort.—*Cincinnati Enquirer*.

# THE AMERICAN ARCHITECT AND BUILDING NEWS

ADVERTISERS' TRADE SUPPLEMENT

No. 264

SATURDAY, JULY 2, 1904

VOLUME LXXXV  
NO. 1488

## ENAMETILE.

In no way is the progress of the day more clearly shown than in our homes. Recent years have seen many and great changes in home building that have improved the appearance, increased the comfort and reduced the cost. With discriminating taste and good judgment in selecting, the modest home can be made almost as attractive in appearance and as comfortable as the mansion.

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No better idea of the range of this work or its possibilities can be had than from the catalogue of the New York Metal Ceiling Co.

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## LUBRICATION OF LOCOMOTIVES.

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Locomotive engineers the country over thoroughly believe in Dixon's Graphite, and hundreds of them bought it out of their own earnings before their companies furnished it, simply because they were held accountable for train delays, and knew that their engines had to have flake graphite to keep them running cool. The locomotive engineer is called upon to make records not only for speed, but for mileage, for haulage, for economy in fuel, in oils, in repairs, and Dixon's Flake Graphite is one of his greatest aids.

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Through the courtesy of the editor of *Railway and Locomotive Engineering*, we have come into possession of the following report. As we have not been given the liberty of publishing the names, we suppress same, believing that the report will be interesting in itself:

"A fast run was made on — division

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## "AS GOOD AS."

"SOMEHOW as I was chewing this subject over in my mind I was reminded of Cousin Elviry Piggott's little boy Oswego. Oswego Piggott was so fond of candy that he ate it until his complexion reminded one of a white plastered wall that has been rained on. Visitors used to bring him candy because he would rather have that than anything else. The worst offender was Mis' Piggott's husband's cousin's wife, who always brought little Oswego broken candy, until finally Mis' Piggott had to remonstrate with her, because it was getting so bad for little Oswego's health.

"The next time Mis' Goswell came to spend the day Oswego nosed around quite a little, but he didn't say nothing. It was evident that he had met with some sort of a disappointment. Finally Mis' Goswell couldn't help noticing it, so she says:

"What is it, Ossie?"

"It seems to me," replied Oswego, "that I smells candy."

"This was too much for Mis' Goswell, so she fished around in her reticule and brought out a small piece of candy.

"There are a great many people who feel that they can break a promise in this way by breaking off a little piece at a time.

"Little Oswego looked at it earnestly for a full second, and then he said:

"Can it be possible that I smelled so small a piece."

"Just so with the architect. When he begins to look around town with some pride on the buildings he has put up, and especially when he looks at the roof of one of the best residences for which he is sure he specified the best material that money could buy, and finds that the tin is all full of little pinholes and is rusting away, and

(Continued on page 3.)

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that the eaves and gutters are leaking, and  
that the owner is telling around town that  
that architect what drew the plans did not  
know his business, he says to himself:

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poor a roof?" and yet he is the one that is  
to blame. All he asked for was a tin as  
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not the architect's notion at all."—RUFUS  
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This Specification calls for no particular brand of materials. There are several good brands. Our advice is to get the best, have a reputable contractor follow the Specification, and the result will be a roof that will give more years of service, without attention or repairs, and at less cost for its whole life than any other known roofing.

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"Over the foregoing shall be laid a five (5) ply Coal Tar Pitch, Felt and Slag or Gravel Roof, to be constructed as follows:

"The Rosin Sized Sheathing Paper or Unsaturated Felt to be used shall weigh not less than five (5) pounds per one hundred square feet.

"The Felt shall weigh not less than fourteen (14) pounds per one hundred square feet, single thickness.

"The Pitch shall be the best quality of straight run coal tar pitch, distilled direct from American coal tar, and there shall be used not less than one hundred and twenty (120) pounds (gross weight) per one hundred square feet of completed roof.

"The nailing shall be done with threepenny barbed wire roofing nails driven through tin discs.

"The Slag or Gravel shall be of such a grade that no particles shall exceed five-eighths ( $\frac{5}{8}$ ) of an inch or be less

than one-fourth ( $\frac{1}{4}$ ) of an inch in size. It shall be dry and free from dust or dirt. In cold weather it must be heated immediately before using. Not less than three hundred (300) pounds of Slag or four hundred (400) pounds of Gravel shall be used per one hundred square feet.

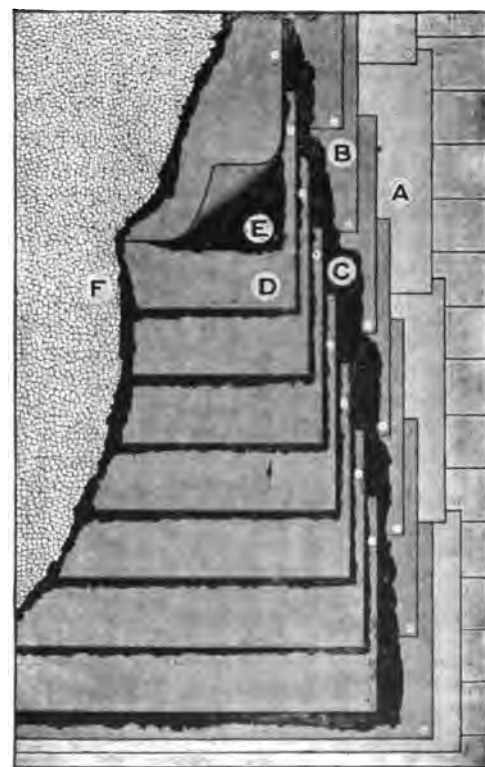
"The materials shall be used as follows:

"First lay one thickness of Rosin Sized Sheathing Paper or Unsaturated Felt (A), lapping each sheet one inch over the preceding one, and nailing only so often as may be necessary to hold in place until covered with the Tarred Felt (B), and the nailing may be omitted entirely if practicable.

"Over the Rosin Sized Sheathing or Unsaturated Felt lay two (2) full thicknesses of Tarred Felt (B), lapping each sheet seventeen (17) inches over the preceding one, and nailing along the exposed edges of the sheets only so often as may be necessary to hold the sheets in place until the remaining Felt can be applied.

"Over the entire surface of the Felt thus laid, spread a uniform coating of Pitch (C), mopped on. Then lay three (3) full thicknesses of Felt (D), lapping each sheet twenty-two (22) inches over the preceding one, and nailing, as laid, every three (3) feet, not more than ten (10) inches from the upper edge.

"When the Felt is thus laid and secured, mop back with Pitch

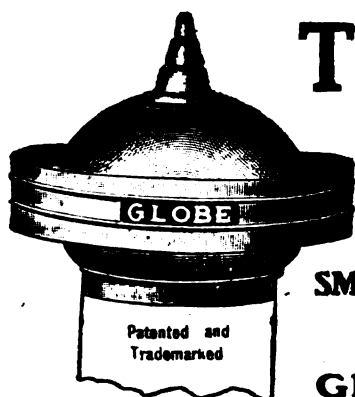


(E) the full width of twenty (20) inches under each lap. Then spread over the entire surface of the roof a uniform coating of Pitch, into which, while hot, embed Slag or Gravel (F)."

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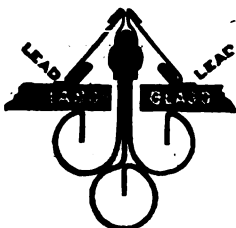
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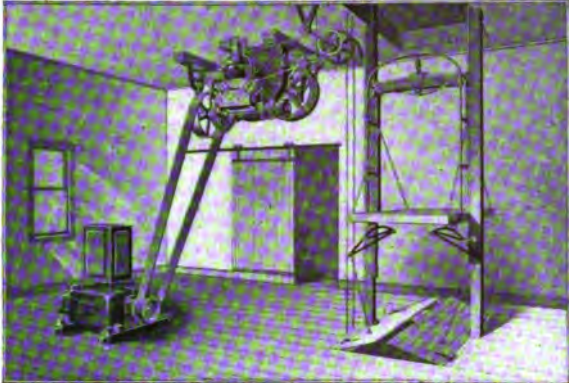
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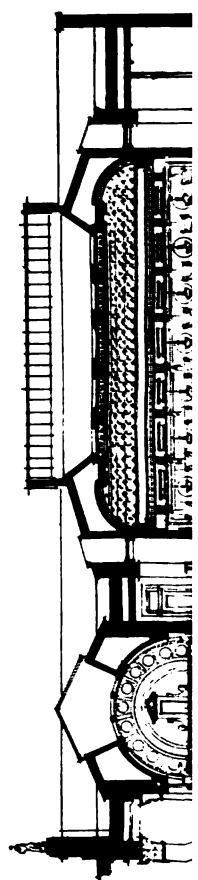
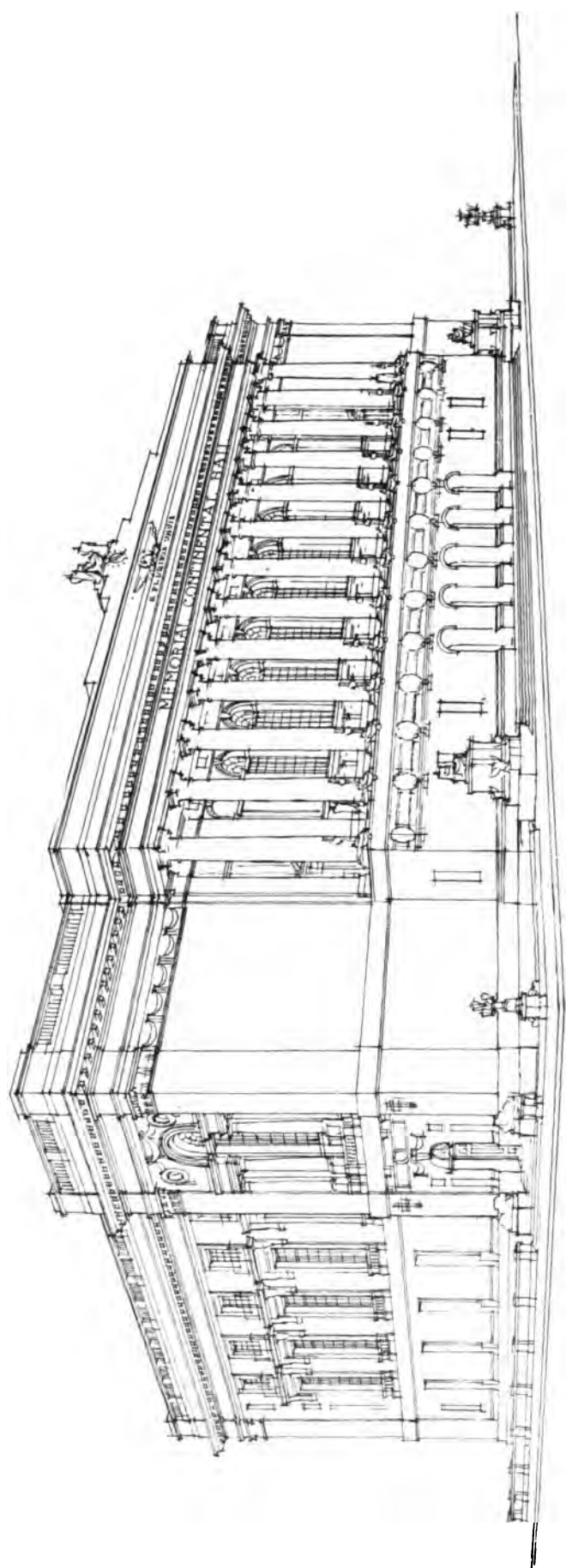
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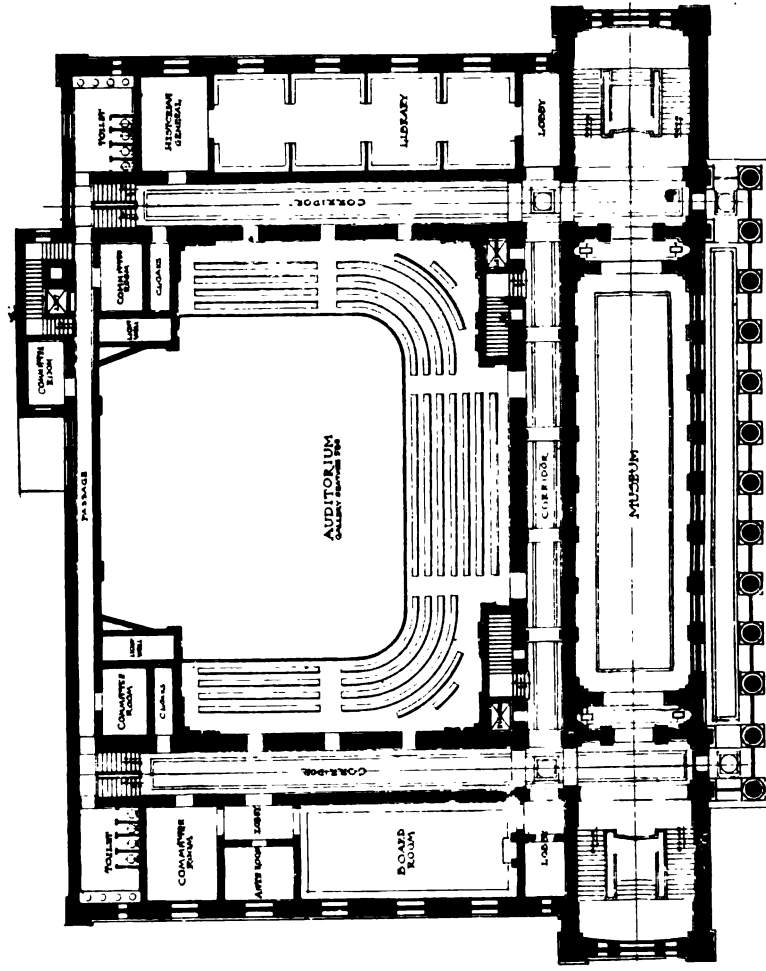
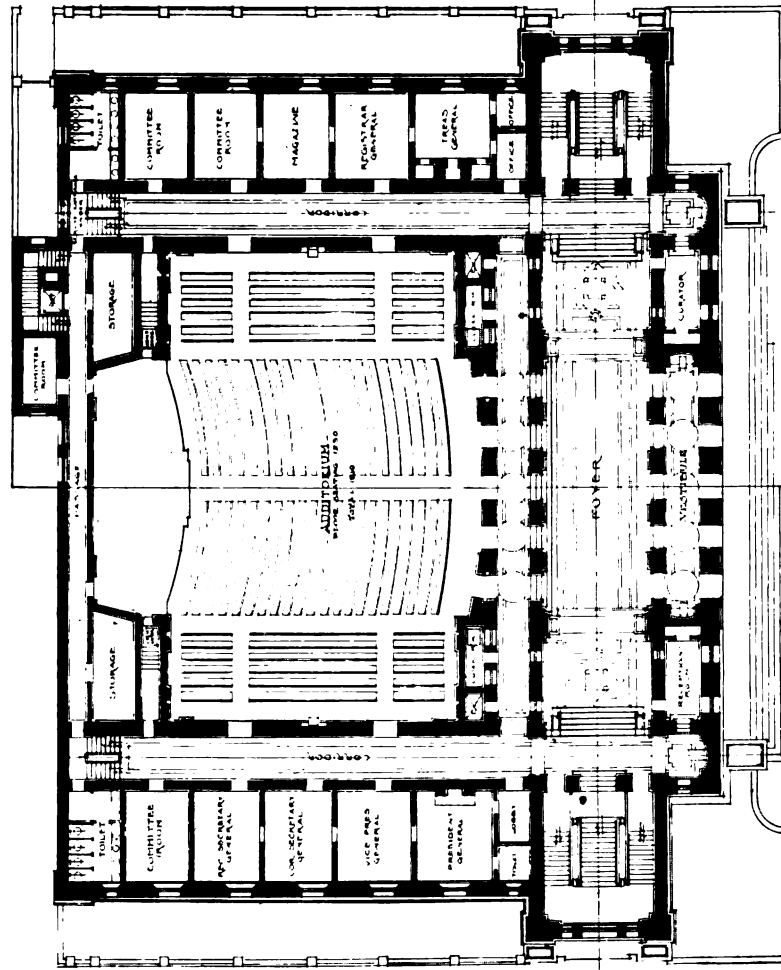
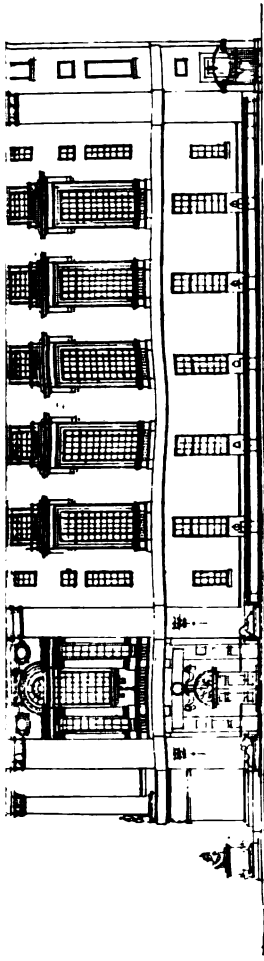
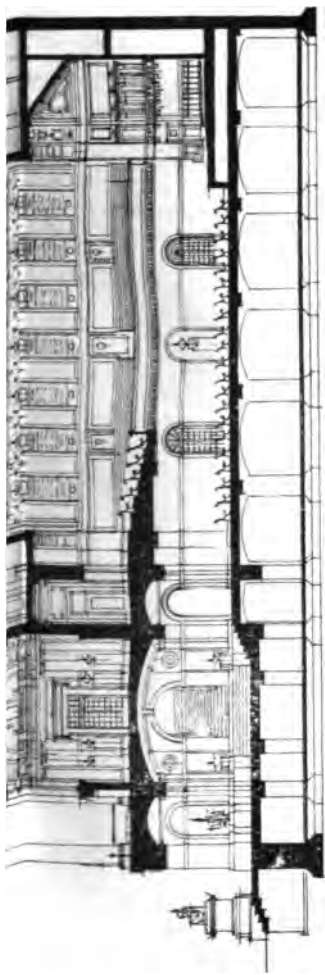
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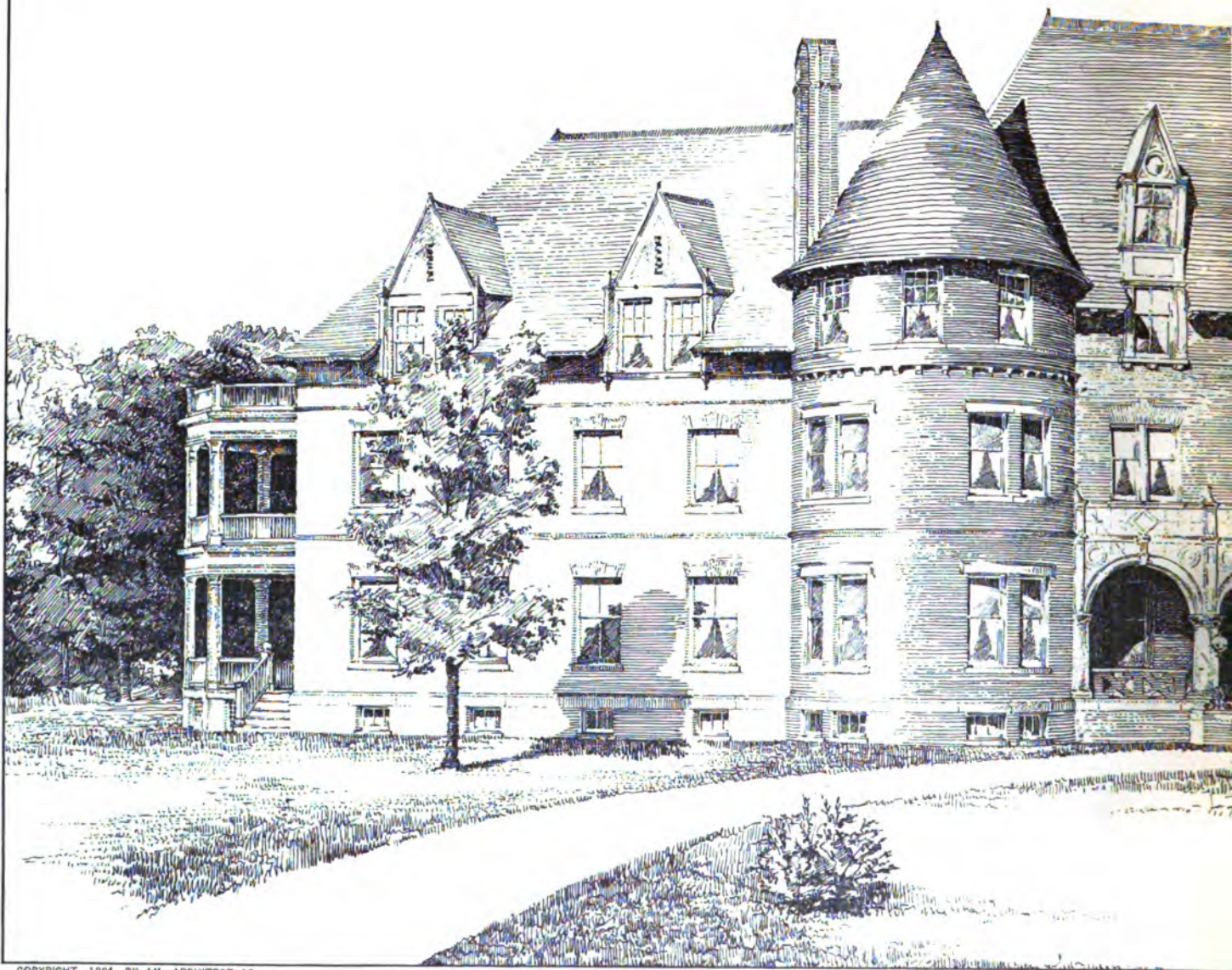




*Competitive Design for a Memorial Continental Hall for the National Society Daughters of the American Revolution, Washington, D. C.*  
*C. H. Alden, Jr.; Calvin Klossing; L. B. Abbott, Architects.*



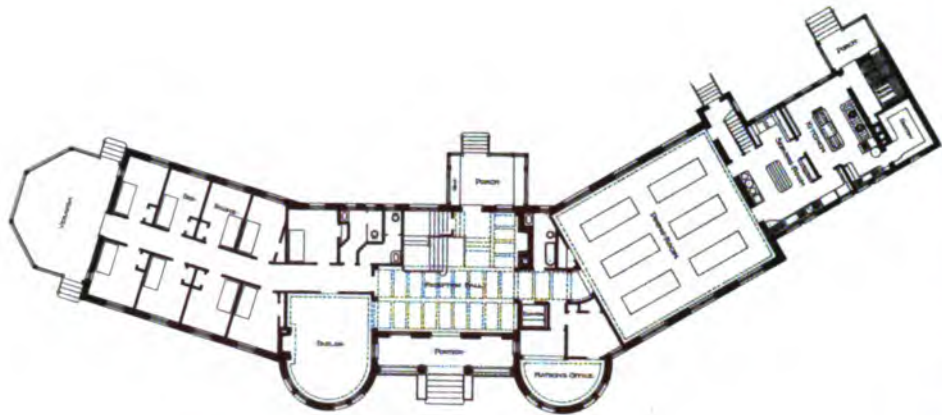




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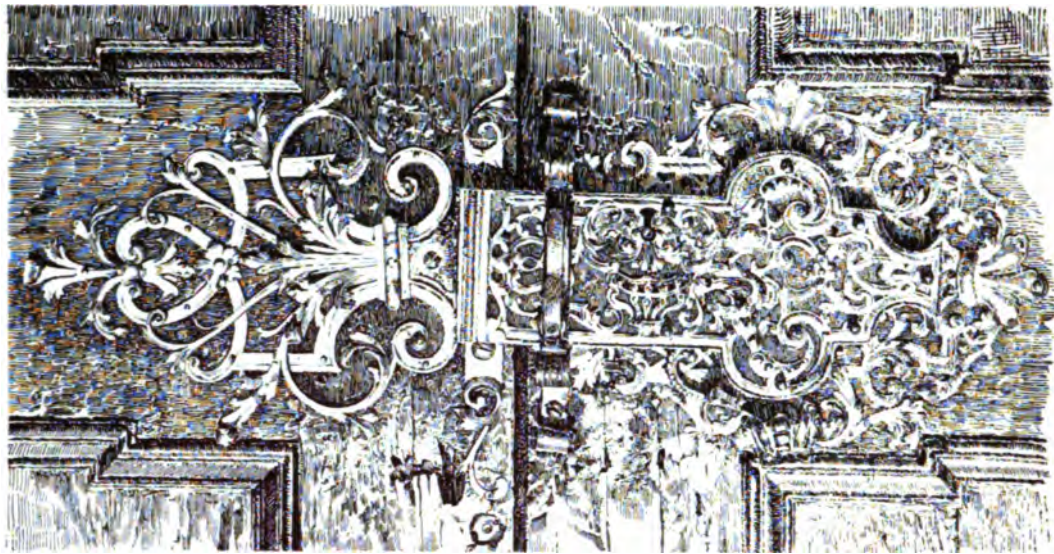
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ERNE, ARCHITECT.

*The American Architect*  
July 9, 1904.  
No. 1489.

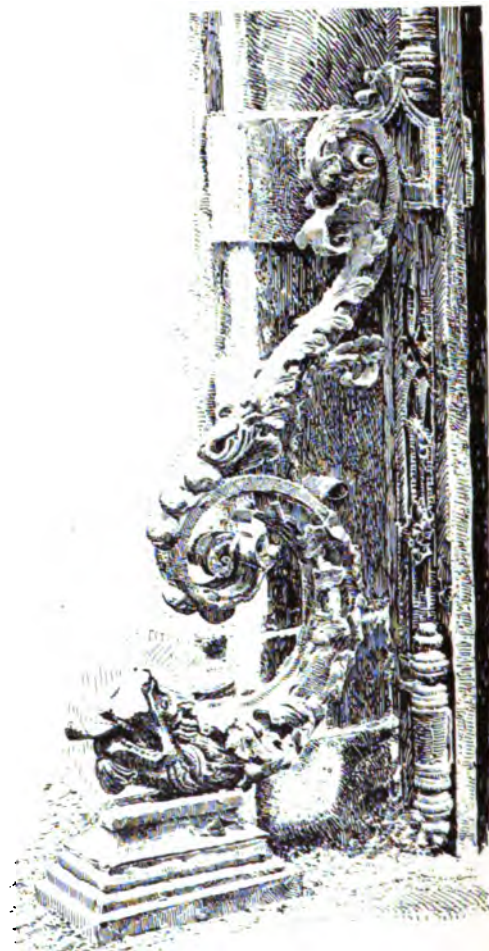
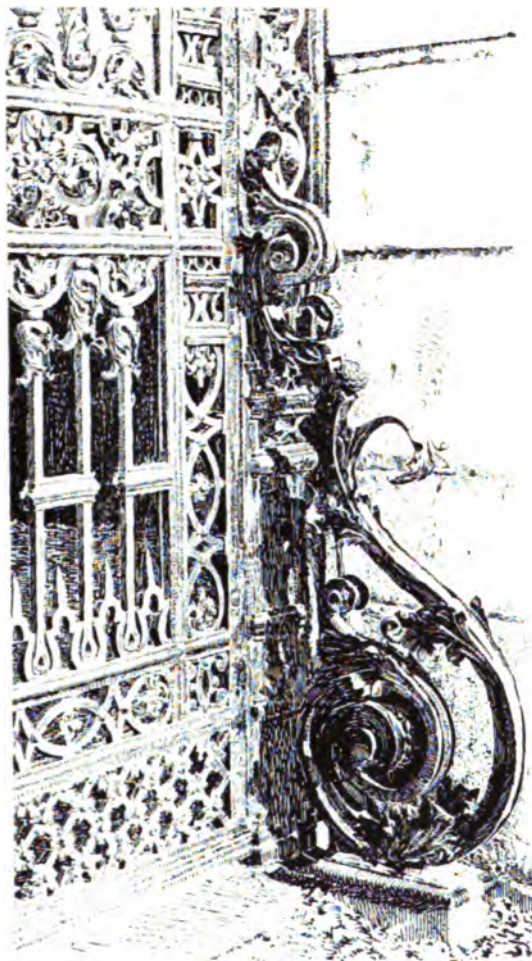








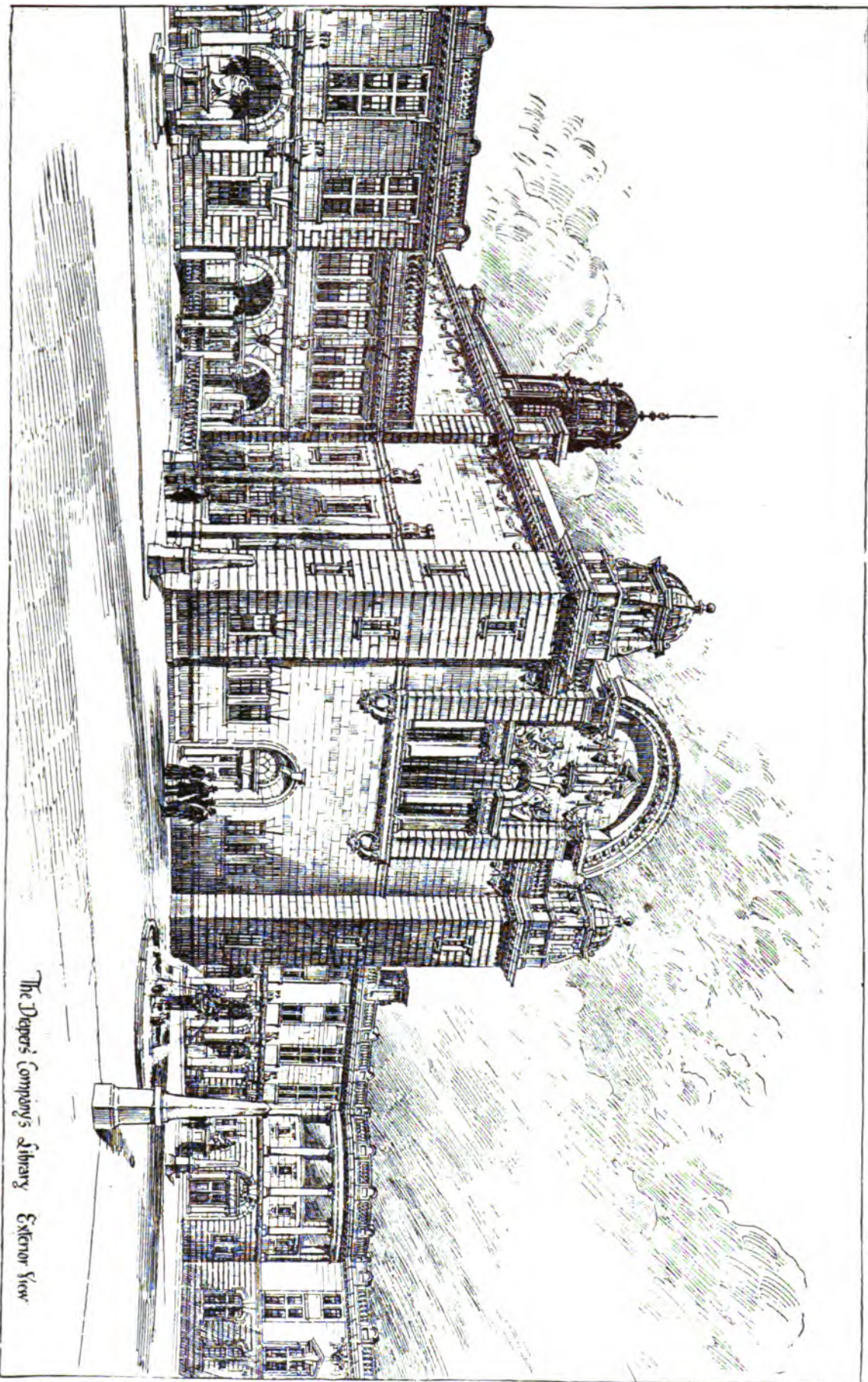
*Lock-plate from the Nicholauskirche, Prague, Bohemia.*



*Park Gate Wheel Guards.*

*From Architektonische Rundschau.*





*The Depot's Company's Library Exterior View*

*From the British Architect.*

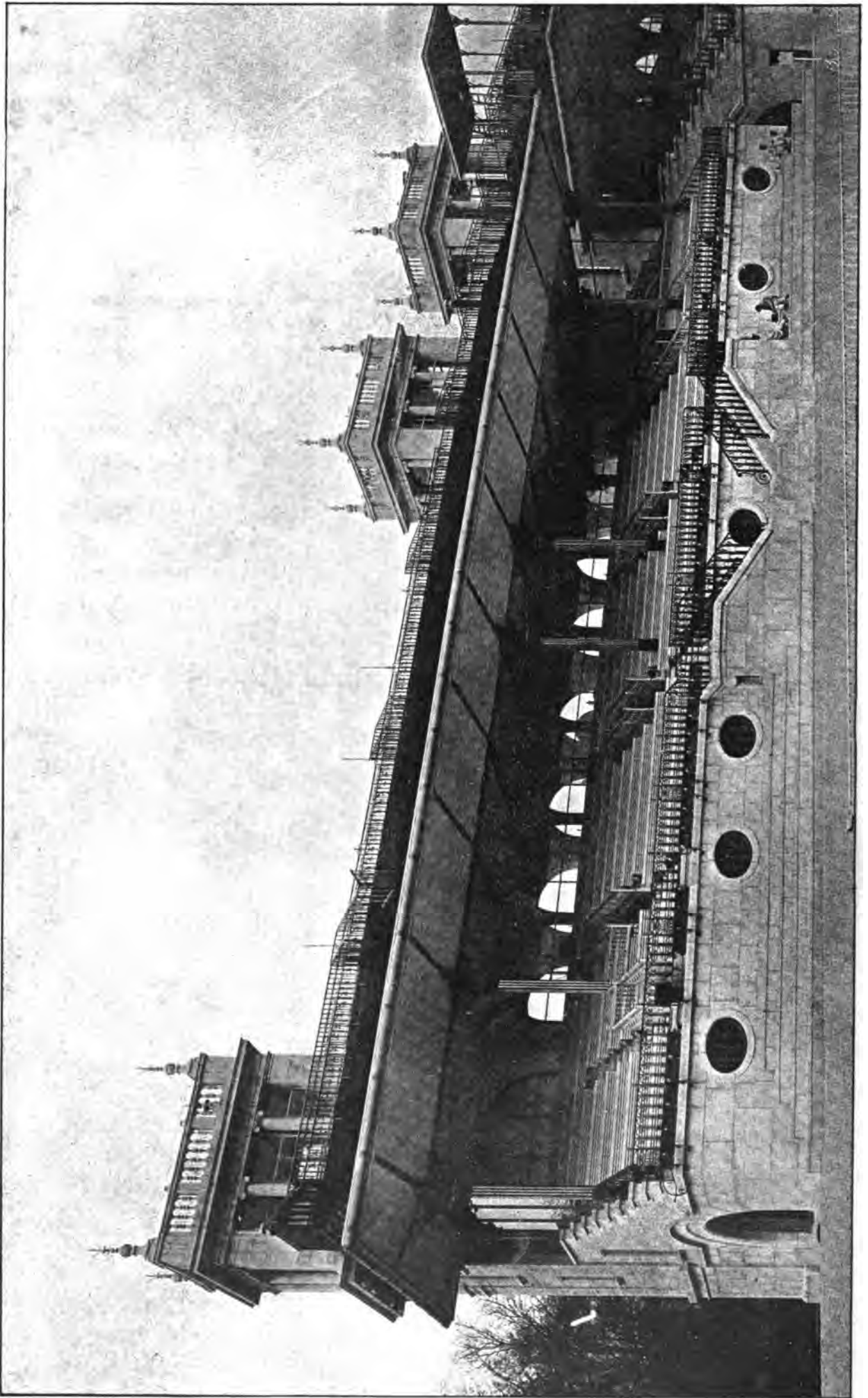
*A Portion of the University of South Wales, Cardiff, Wales.  
W. D. Caroe, Architect.*

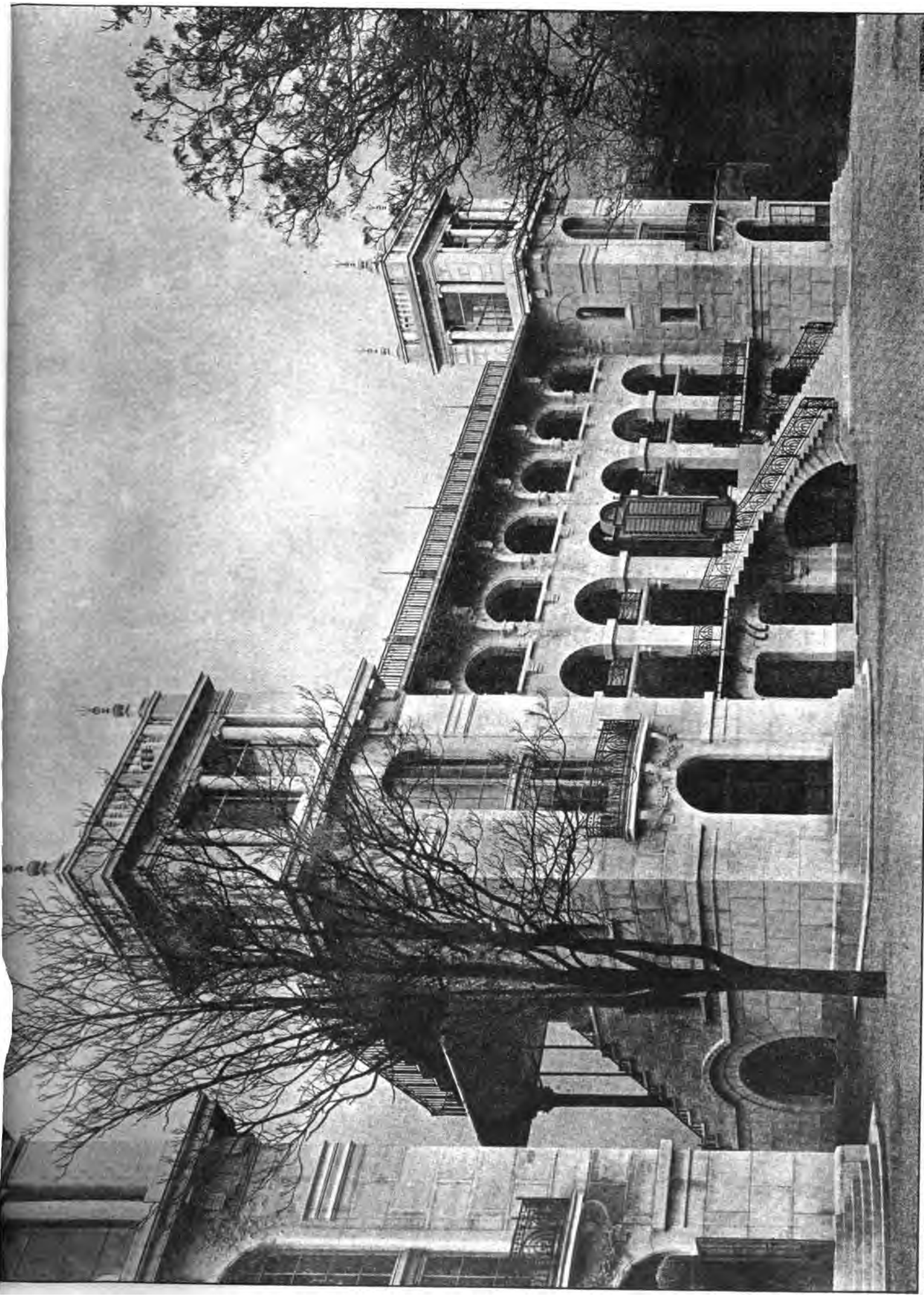
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THE GRAND STAND AT LONGCHAMP, PARIS.  
M. GIRAULT, ARCHITECT.

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# THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. LX XXV

SATURDAY, JULY 9, 1904

No. 1489

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FOR weeks the attention of the public has been turned on the horrors of the burning of the excursion steamer "General Slocum," and the newspapers, at least, have hailed with enthusiastic approval the coroner's verdict, which makes a number of men criminally responsible for the loss of over a thousand lives, and they seem to gloat over the idea that these unfortunates may have to suffer other punishment than the sorrow and torment due to their own consciences. We feel that these men are sufficiently punished already and that further visitation of punishment would be vengeful merely, not disciplinary. The men, with perhaps one exception, have done no more wrong than nine men out of ten of us do every day of our lives in calmly deciding to disregard the laws and ordinances of the community in which we live. We take chances ourselves every day that the law can, in our case, be successfully evaded and no ill to others come from the evasion. These men are no worse than we; they happen merely to have been found out and already are bearing a terrible punishment in the way of uneasy consciences. And now it is proposed to make them suffer, as an example to others, who will forget it the next day. Punishment applied in this way does little good preventively speaking, but punishment visited upon those whose duty it is to enforce the law, but who do not enforce it, would be punishment well applied and likely to be fruitful in preventive ways. The corps of steamboat inspectors either know or they do not know that the vessels they pass are safe and well equipped. The real responsibility rests with them, for owners and crews are doing only what all the rest of us, members of the business world, are doing every day, that is, paying regard to just what portion of the laws it pleases us to give heed to, and taking the chances with the rest, no matter what the risks to ourselves and others actually may be. We beat the customs when we can; we exceed the speed limit on our autos. and road-wagons; we have grave doubts about

that elevator-rope, easily assuaged by an inspector's certificate—paid for, perhaps; we know that that boiler under the sidewalk has warped plates, but we do nothing to correct these things simply because some official has not found us out and put the law's compulsion upon us. The place to apply punishment in nine cases out of ten is upon the officials who do not enforce, not upon the casual few, out of many undetected, who break the laws. In matters of education and discipline, it is easier to deal with the few than with the many, and until means are found to compel officials to enforce the law the public must suffer the consequences of its non-enforcement, and we do not believe that a more efficient means can be found for making officials understand that the public expects them to enforce the law than to punish them for the infractions their own negligence allows some other members of the public to effect. We were glad to see in the indictment of the Mayor of Chicago by the coroner's jury, at the time of the burning of the Iroquois Theatre, an indication that this view of official responsibility might in future have its proper effect on official action, but unfortunately the Grand Jury took a more lenient view of the matter. In the case of the "General Slocum," the inspector who actually examined the boat is likely to be made the official sufferer, when everyone believes that he discharged his duty in a normal manner, quite in the style his superiors expected him to discharge it, the manner in which his fellow-inspectors are known to discharge it. One thing at least seems indisputable: the United States Government is responsible for the loss of these thousand lives; the United States Treasury is morally responsible in civil damages to the heirs-at-law of the victims and unless the United States makes such reparation as can be made then the government and the country are undeserving of the love good citizens desire to entertain for them.

A MAN who for sixty-seven years—the entire life's length of Leonardo da Vinci—had practised art industriously and successfully may well be called an artist, even if during that long time he had accomplished nothing of much significance. But George F. Watts, who, in his eighty-seventh year, laid down his brush for ever last week, could claim the title on many different scores. It is rather bewildering to imagine the vast number of canvases that such rapid workers as Sargent and Herkomer might cover in a working life of sixty-seven years and though working at a more leisurely rate the number of paintings that Mr. Watts actually finished is very considerable. Probably few painters of his standing and ability keep on hand so many of their own works as did Watts; he was well-to-do and had rather an objection to selling his work for money, preferring to make a present of it to some friend or to a public gallery. This trait was well shown when he presented to the National Gallery of British Art his collection of over forty portraits of noted Englishmen—we believe it was his hope, at one time, to make this Watts Collection an even hundred

of portraits of men of real standing in the intellectual life of the country. Like Meissonier and Gérôme, Watts in his later years took up the sculptor's modelling tools, but, while Meissonier was content to model statuettes, nothing would suit Watts but the colossal. One who knows the real laboriousness of modelling at large scale cannot but wonder at the vitality of an octogenarian who in the last two years of his life was engaged in modelling the colossal equestrian group called "Physical Force," for the tomb of Cecil Rhodes, in South Africa. Another colossal equestrian group in bronze by Watts is the "Hugh Lupus" that stands before Eaton Hall, the Duke of Westminster's place, near Chester.

**M**R. WATTS was of humble birth, yet in his later years twice declined a title, the alleged goal of every Englishman's ambition. In place of the vulgar glory of a title to be shared with many an unworthy fellow-wearer, he was glad to accept a far more significant honor when King Edward bestowed upon him, amongst the first, his new Order of Merit. It was thirty years after he first exhibited at the Royal Academy that, in 1867, he was himself made an Academician, although he had offered himself for an Associateship in 1849, and another thirty years had elapsed when, in 1897, at the age of eighty, as a consequence of a special exhibition of his works then held, he had the pleasure of receiving a congratulatory address signed by hundreds of the most eminent of Englishmen in many walks of life. In 1843 and again in 1848 his designs were selected in competition for two of the historical frescos which decorate the Houses of Parliament. One of his interests in recent years was to establish a record of heroic deeds, and for this purpose he erected in St. Botolph's Church, Aldersgate, London, a wall whereon are inscribed the names of those who perished while endeavoring to save the lives of others—a sort of precursor of the Carnegie Hero Fund.

**G**OVERNOR BATES of Massachusetts has appointed a very excellent commission to consider the revision of the existing building laws of the Commonwealth, an architect, a lawyer and a real-estate trustee, a body large enough for a real working force and combining the needed experience in the proper degree. At present, the State laws are mainly concerned with the proper building and maintenance of factories, schoolhouses, hotels and public buildings, but as the State becomes more thickly settled the State Police, upon whom rests the enforcement of these laws, find it desirable to give more and more attention to the methods of building employed in mill villages and small factory towns which as yet have no local code of laws of their own; and for this reason it has become advisable to add to the present laws some of the refinements of particularization that belong to city building codes. There is always some chance of clashing between a municipal building ordinance and a State law, as we recently pointed out in the case of the proposed State theatre law, and, hence, a temptation to appeal from Peter to Paul, at times, according as one law or the other may seem to be most considerate of the desires of the builder. All difficulties of this kind, however, might be easily removed by an enacting clause that the conditions of the State law should never

take the place of more stringent similar conditions already adopted, or to be adopted, by any municipality.

**F**ROM the fifteenth to the twentieth of October next there will be held in the Grand Palais des Champs-Élysées an international congress of unquestionable interest, far greater, it seems to us, than the International Congresses of Architects, where the field is altogether too broad to be covered at one series of meetings. The one we now refer to is the Premier Congrès international d'Assainissement et de Salubrité de l'Habitation, and, like all sanitary congresses, it will consider matters of hygiene which appeal to the individual in all classes of society. The work of the Congress will be divided between six sections, the sixth of which covers a very unusual line of investigation since it concerns "les Habitations flottantes," that is, the hygienic condition of men-of-war, vessels of the mercantile marine, fishing-smacks, house-boats and canal-boats. The other five sections concern themselves with Urban Dwellings, Country Dwellings, Workmen's Dwellings, Furnished Apartments and Lodging-houses—including hotels at the seaside, at medicinal baths, and in cities, and Boarding-schools. To a considerable extent the announced syllabus for each section is identical, but the items in which they differ show how thoroughly the entire scheme has been studied and organized. The committees in charge of each section will prepare in advance of the meeting a thorough report on its branch and distribute it in print to all members of the Congress, so that they may have time to prepare for the discussion. It should be well worth the while of any architect visiting Paris at that time to spend the twenty francs which will secure him a membership in the Congress, its printed report, a share in the gaities and excursions and an artistic badge as a souvenir. Further information may be had by addressing the secretary, M. F. Marié-Davy, 7 Rue Brezín, Paris (14<sup>e</sup> Arrondissement).

**H**ENCEFORWARD eternal vigilance on the part of the public, the bar associations and professional societies of all kinds will be needed to prevent the general public from receiving outrageous wrong at the hands of organized labor. The labor unions have been aroused to the fact that the common and statute laws as they exist grant their members no privileges that other men cannot claim with equal justice; and as decision after decision has made this clear, an unendurable condition of things from the point of view of Labor has been revealed, and the champions of organized labor, as a consequence, have set themselves to procure the enactment of laws which shall give to the unions special privileges that the rest of the world does not enjoy. So, if other cities do not wish to be reduced to such a condition of servitude to the unions as now exists in San Francisco, they must give close and continued attention to all measures that are brought before the legislative bodies of States or towns. A bill has just passed its second reading in the English House of Commons, by a narrow majority, which will practically nullify the famous Taff Vale decision of the House of Lords, which gave all English employers high hope that they might once more conduct their business as the existing laws gave them to understand it might be conducted.



LESSONS OF THE BALTIMORE FIRE.<sup>1</sup>

**M**R. PRESIDENT AND GENTLEMEN:—Before proceeding with what I have to say concerning the Baltimore fire, I wish to express my sincere appreciation of the honor conferred upon me in the invitation to address you on a subject of such moment to yourselves. Having been in charge of a number of building enterprises for the United States, I have always been deeply interested, from a professional point of view, in fire-resisting construction. If my opinion seems worthy of attention on the part of those having the most at stake in every fire, it is comforting assurance that my time and study have not been spent entirely in vain, notwithstanding my lack of commercial interest in the subject.

What I shall say of the lessons to be drawn from the Baltimore fire applies especially to fire-resisting buildings in a congested district, where the conflagration hazard is serious and imminent. For buildings more fortunately placed, my deductions might be considerably modified.

Nothing happened at Baltimore that might not have been foretold from a study of the fire records of the past, provided the conditions had all been known and fully appreciated. Some of these conditions, however, would hardly have been estimated at their full value before it was disclosed by the conflagration itself, and it needed just such a catastrophe to fully emphasize certain truths, which, though plainly revealed in previous fires, have never received due consideration in the design and erection of modern buildings. A careful study of the results at Baltimore is therefore necessary, and, if properly made, it should lead to better buildings and smaller fire losses.

To an engineer engaged in such a study of the Baltimore ruins, the following general facts stand out in bold relief:

First. In our designs so far, we have resorted to inadequate measures for fire resistance, and almost none at all for fire prevention. We have worked almost entirely on the basis of a fire originating within; exposures have received scant attention, and the conflagration hazard almost none at all. Like a general on the defensive, who has provided meagre protection for his front, and none at all for his flanks and rear, we find an active and aggressive enemy, after the battle, in possession of most of the field.

Second. More mass is required to resist fire than to carry superimposed loads. In the craze for lightness and cheapness, the modern fire-resisting building has been reduced to a degree of flimsiness wholly inconsistent with satisfactory behavior in a severe fire; and it may be added that this same flimsiness will insure equally unsatisfactory results against the slower but always active elements.

Third. The standard of workmanship in these buildings is very low—often criminally so. The factor of safety provided in the design against other contingencies is drawn upon for 100 per cent as tribute to dishonesty and carelessness. Owners need to learn the value and the necessity of adequate inspection, and it does seem that some architects should enlarge their ideas of what is meant by the word "supervision."

Before going into details, a meaning will be suggested for the term "fireproof building." To deserve the name "fireproof," it is submitted that the building should be so constructed that it will stand in any fire that is liable to rage around it, not only protecting its own contents from ignition, but acting as a positive barrier against the spread of the conflagration; if a fire is started within, it should be confined, by the qualities of the building itself, to the unit of space in which it begins; in either or both events, the parts of the buildings exposed to fire should suffer no material damage except to renewable finish, and this finish should not constitute a large percentage of the cost of the building.

Considering first the outside walls, it is evident that no building stone of any kind is even reasonably fireproof. The amount of stone should be kept down to a minimum, and it should not be used at all in stories above the second, except, possibly, for window-sills.

Ornamental terra-cotta—especially when it is *very* ornamental—is liable to spall; it should be as simple in design as possible, of a stable and fireproof color and the thickness of the material itself made much greater than is now customary; it should not be less than 1½ inches; all cavities should be filled with cement, mortar or concrete, and heavy projecting courses of cornices should be securely tied back with steel anchors. If these pre-

cautions were always observed, it is probable that ornamental terra-cotta would give a much better account of itself than it did at Baltimore, where it suffered very general damage from both spalling and discoloration.

The prevailing material of outer walls should be first-class brickwork. The brittle, dense face-bricks, made by the dry process, spalled rather badly at Baltimore; the same was true of enamelled and other extremely hard bricks. Face-bricks, bonded to the wall only by metal ties, were stripped from the walls in large areas, as especially exemplified in the Continental Trust Building. Bricks should be made of good refractory clay, and burned to the point of maximum toughness, but not to vitrification; they should be laid in cement mortar and bonded with real headers. Walls so constructed, and of sufficient thickness, are an ideal barrier against fire; but they must be of adequate thickness, and the Baltimore fire proved that they are generally too light. The minimum thickness of an outside wall should be two whole bricks—that is, from sixteen to eighteen inches. Outside walls only a brick and a half thick were badly cracked at Baltimore—they had not mass enough. Yet their behavior indicated that another half brick would have made them thick enough, in the upper stories at least.

It is much to be doubted whether the typical steel-skeleton structure, carrying its walls by stories on the steel frame, is ideal as a fire-stop. It is probable that the outer walls would suffer less damage in a fire, if they were self-supporting from the foundation up, but well anchored to the steel frame by heavy ties at short intervals. This would make one homogeneous mass, not liable to be thrown into the street by an expansion or twisting of the spandrel beams, which destroy the integrity of the curtain-wall where they are used. It would interpose a greater thickness of protecting material between the steel and all external agencies of destruction, whether the elements or a conflagration. It would require more time to build, for work could not be started in different stories at the same time. Some designers would object that it would cause eccentric loading of wall columns if the weight of the wall is taken off them, but this can be overcome by a little special designing. A brick wall, over 300 feet high and of uniform thickness, is safe enough under its own weight if it is secured against buckling, as it would be if anchored to the frame. Of course, a wall should be thicker in the lower stories for fire-resisting purposes, and this would make it still more stable structurally; but in no case would it be necessary to make any part of it more than 3½ bricks thick, even in the lowest stories, if the work is well done. The steel saved in wall columns and spandrel beams would almost pay for the extra thickness of walls.

Window openings in outer walls should be reduced to a minimum in both size and frequency. The current type of office buildings has its windows unnecessarily and dangerously large. There is ground for suspicion that this often results as much from a desire for low first cost as for light and air. Mullioned openings are bad in all cases, for the mullion is almost sure to fail; if it carries any weight, it is dangerous; if it does not, it is severely damaged itself, and, by its expansion, is apt to damage the masonry surrounding the opening. This is notably the case where the mullions are of naked metal. All window openings, therefore, should be single, and light piers of any sort, whether called mullions or not, should be avoided in exterior walls.

No lintel is equal to a brick arch. Hollow terra-cotta and stone spall under the fire and metal lintels are almost necessarily left exposed. In the Continental Trust Building the spandrel beams of the rear and court walls were immediately above the window openings carrying the terra-cotta lintels, which, in turn, served as protection for these beams themselves. The terra-cotta cracked and spalled and exposed the beams; the naked cast-iron mullions in the windows added their quota of destructive effort, and the walls were almost totally destroyed.

Even good brickwork is liable to spall on square corners where exposed to the fire. As far as possible, therefore, all salient angles should be rounded to a radius of at least three inches, if liable to such exposure. This applies to other forms of masonry, including concrete, as well as to brickwork. Before leaving the subject of materials for the masonry of the outer walls, it should be stated that the behavior of Portland-cement concrete at Baltimore is quite a sufficient indication that it is a suitable material for outer walls, so far as fire resistance goes, although not as good as the best brickwork. The behavior of hollow tile indicates that it is entirely unsuitable for outer walls in its ordinary commercial forms, which are all entirely too light.

The protection of window openings is the most vital and serious question demanding the attention of those concerned in

<sup>1</sup> Address of Capt. John Stephen Sewell, U. S. A., at the Annual Banquet of the National Board of Fire Underwriters, Delmonico's, New York, May 12, 1904.

fireproof building operations in congested districts. From the underwriter's point of view, the so-called fireproof buildings in Baltimore were but little more desirable as risks than the non-fireproof buildings; in both classes of buildings the contents were a total loss; in the non-fireproof buildings the same was true of the buildings. In the fireproof buildings the average cost of really restoring the buildings to their original condition would hardly be less than sixty per cent of their original value. When considering what shall be charged for the conflagration hazard the underwriter has, therefore, but a small margin of allowance for the current types of so-called fireproof construction, even on the building itself, and none at all on the contents; the adequate protection of openings, combined with a slight increase in thickness of walls, would at least double this margin on the building, besides removing almost entirely the conflagration hazard from the contents. To what extent and how the external openings shall be protected is, therefore, to be most seriously considered. It would seem that the time is at hand when all windows should be glazed with wired glass, which, on principal fronts, could be polished; sash should be made of metal adequately stiffened; and frames should be of cast-iron or sheet metal stiffened. In addition to this, all external openings should have some means of absolutely closing them, even on wide streets. One would hardly have thought the fire in Baltimore would have entered the Continental Trust Building from the west, but it did. Shutters or other fire-stops on principal streets could be left open ordinarily, and closed only when a fire in the vicinity threatens the building; but when the emergency arises they should be available. Whether tin-covered wooden shutters are adequate seems open to debate; very light corrugated rolling-shutters are certainly inadequate. It would seem that a good form of shutter would be a steel plate about three-sixteenths of an inch thick, stiffened around the edges and hung like a sash. This would require a box-head frame, in addition to the regular window frame, the box head being required to give a full opening for light; but if walls were made as thick as they ought to be, this would be a simple matter. The frame would have to be of steel or cast-iron, well pocketed into the brickwork, with a little room for expansion. There are certain compositions in the market, made up with asbestos as a base, which can be worked like wood, are incombustible and retain their rigidity even under high temperatures. If these compositions should prove equal to their present promises, there is no reason why sash-frames, fire-doors and fire-shutters should not be made of them. The fire-shutter could be a single sheet,  $\frac{1}{2}$  inch thick, sliding like a sash. A box-head frame for this form of shutter also would be necessary, to enable the full glass opening to be exposed. Had the fireproof buildings in Baltimore been provided with such shutters they could have been closed in ample time, and probably the total loss to these buildings and their contents would have been not over twenty per cent of what it actually was. The possibility of providing really efficient fire-shutters by hanging them like sash, is a strong argument for thicker walls. Another is the fact that fire will not communicate as readily through even unprotected openings in thick walls as in thin ones. To sum up what Baltimore taught about outside walls, we may say:

Thickness should be increased to a minimum of two bricks in upper stories with a reasonable increase below; better results will be obtained by building the walls continuous from the foundations up; stone should be reduced absolutely to a minimum. Terra-cotta should be heavier, and of plain design and stable color. Bricks must be the prevailing material, and they must be hard and tough, but not vitrified; they must be bonded with real headers. Openings must be as small as possible, without mullions, and finished with brick arches and bull-nose bricks, as far as possible. All openings should have adequate fire-stops, even though they are habitually left open on principal fronts. Wired glass and incombustible sash and frames should be used everywhere.

It goes without saying that roofs should be as carefully looked after as the walls. The various forms of vitrified-tile roof-finish are probably the best. Skylights need the same attention as windows, though their exposure is not generally quite as severe.

Coming now to the interior construction and finish, we have, in any case, only to consider the effects of an interior fire; even though the contents of a building be ignited from without, it is only the fire due to the combustion of the contents that really tests the inside work. Notwithstanding the high repute in which cast-iron for columns is held by some underwriters, it is too unreliable from a structural point of view to be approved by engineers. Steel columns adequately fireproofed, are able to

meet all requirements, and should always be used, where a brick or concrete pier is not applicable.

The Baltimore fire was not needed to demonstrate the fact that structural metal of all kinds must be protected from high temperatures, by some adequate form of incombustible, non-conducting covering. Nor did it need this fire to prove that the floor arches and partitions must be of similar material. What the Baltimore fire did demonstrate, however, was the extent to which the materials in common use performed their functions.

The material used for fireproofing, whether in the form of floor arches, column covering, beam and girder protection, or partitions should, as nearly as possible, conform to the following requirements:

1. It must be incombustible.
2. It must undergo no molecular change in a fire.
3. It must be a reasonably poor conductor of heat.
4. It must have considerable mechanical strength, and be applied in such form that it will be able to perform any necessary structural duty, and at the same time to resist the stresses set up by the sudden application of heat followed by the equally sudden application of water.

It is not sufficient that the fireproofing protect the steel; it should itself be intact and without need of repairs, after not only one, but several, ordeals of fire and water.

The Baltimore fire proved that the only material that fulfills all of these requirements is good brickwork laid in cement, with real bond. Concrete is almost as good, but is subject to a gradual molecular change, due to calcination. Plaster of Paris is deficient in mechanical strength, and becomes calcined very quickly. This applies more or less to all of the forms in which it is applied. Hollow tile, in all of its usual forms and applications, is too brittle and too flimsy; if it were always made of tough, refractory clay, in the form of porous terra-cotta, with webs never less than  $1\frac{1}{2}$  inches thick, it would probably be almost as good as brickwork.

All forms of plaster of Paris fireproofing failed utterly at Baltimore, except the lime of tile floor arches, which, thanks to a considerable thickness, stood very well; but if plaster of Paris enters largely into lime of tile, these arches were probably deeply calcined, and damaged much more than they appeared to be.

Hollow tiles gave a poor account of themselves; in most cases they protected the steel, but will have to be renewed themselves. This is no fault of the material, but of the form in which it is applied. The webs are too thin; on the exposed faces of the tiles, the webs become hot clear through; the rest of the tile is surrounded by dead air-spaces and remains comparatively cool. The exposed webs yield to the strains induced by this condition, and drop off. The dead air space as a factor in fireproofing, is a fallacy, except where it exists in the form of pores, or where the webs are so thick that the entire variation in temperature occurs within their thickness, so that the inner side of the exposed web remains cool. What is needed for fire-resistance is a homogeneous material, of low conducting power, and of sufficient thickness to win the battle on the first line of attack. It was noticeable, at Baltimore, that where the plaster adhered, the tiles were not much damaged; this in itself is an indication of the value of greater thickness in the exposed webs. It has been quoted as a tribute to the hollow tiles, "that not even the plaster was damaged"; but the truth is, it is rather a tribute to the plaster, which was between the tiles and the fire. Where it adhered, it saved the tiles; where it failed, their failure was general. It follows from this that it is worth while to finish all fireproofing with good hard plaster, the best form of which is ordinary lime mortar gauged with Portland cement.

Concrete gave an excellent account of itself in the Baltimore fire. It is not equal to brickwork, nor as good as hollow tiles would be, if they were always of good porous materials, at least  $1\frac{1}{2}$  inches thick; but it is better than any commercial form of hollow tile, and better than the best plaster of Paris compositions. It calcines to some extent and spalls at square corners. All salient corners should be rounded and an allowance of at least an inch in thickness should be made for calcining. If this were done, it would be good for a number of severe fires without other repairs than plastering. It has been urged that the condition of certain cinder-concrete partitions and filling between floor sleepers at Baltimore proves this material to be utterly worthless. The fact is that this concrete was probably worthless from the beginning, as any one knows who has seen the average cinder-concrete gang at work. Cinder concrete, well made from

clinkers and ashes and free of combustible matter, is one of the best fire-resisting materials we have. But it is not safe to indorse cinder concrete in general terms, because so much worthless trash is paraded under this name. Broken bricks, broken slag, gravel and broken stone, all make good fire-resisting concretes, the stone being the least desirable. The aggregate for fire-resisting concrete should all be capable of passing a  $\frac{3}{4}$ -inch or, at most, a 1-inch screen.

The ideal column in a fireproof building is one built up of rolled steel members, covered with four inches of good brickwork or concrete, and with all the interior space filled with concrete. Pipes should not be carried up inside of the column coverings,—only, however, because they should not be concealed. To the buckling of heated pipes was attributed the failure of many terra-cotta column coverings at Baltimore. But if the column coverings had not failed first, it is hard to see how the pipes got hot enough to buckle. Once the covering opened, no doubt the buckling of the pipes completed its ruin. But the initial failure must have been in the covering itself. The ideal girder protection is, on the lower flange, at least  $2\frac{1}{2}$  inches of solid porous terra-cotta or good concrete, with four inches of brickwork or concrete to protect the webs. The ideal floor system is a segmental brick arch, with protecting skewbacks at least two inches thick under the flanges of the floor beams, or an equivalent construction in good concrete. For the floor arches heavy porous terra-cotta hollow tiles could be substituted, if a flat ceiling is wanted. For partitions, either bricks, the heavy hollow tiles described above or good concrete, built from the floor arches below to the ceiling above will meet all requirements. Nothing less than a solid brick wall is a safe enclosure for a fireproof vault; those walled in with hollow tiles failed in many cases at Baltimore.

Reinforced concrete in the hands of competent designers and good workmen is capable of displacing steel entirely for buildings of moderate heights, and of displacing steel girders, beams and floor members everywhere, with improvement in fire-resisting qualities as compared with current types of structures. But it is too early in the day to hope for general acceptance of this view, although there is not the least doubt of its correctness in the minds of those who have given the subject thorough and impartial investigation.

Much could be added on the subject of sub-division of floor space, isolation of stairways, elevator wells, etc., and on sprinkler systems, and other means of preventing fire or extinguishing it in its early stages; but no new lesson was taught at Baltimore, and an engineer could hardly hope in any event to add to the underwriter's store of knowledge on these subjects. It may be added, however, that combustible trim—floors, ceilings, wainscots and other finish in marble and stone, plaster, grille work, chandeliers, etc.,—in fact, all that is ordinarily included under the term interior finish, can never be fireproofed; viewed as a risk, they are all in the same class with the wooden tables, desks, chairs, etc., used by the occupants of the building.

Finally, it may be said that much of the damage at Baltimore was due to poor workmanship as well as to flimsy design. Many terra-cotta partitions and column coverings were so loosely laid up that they were entitled to fall down without any other excuse at all. There were cubic yards of bricks in the walls of the Continental Trust Building which were simply thrown in loose without any pretense of laying. It should be remembered that good workmanship may save a defective design, but no excellence of design can adequately provide against dishonest work.

#### M. CHOISY AND THE ROYAL GOLD MEDAL.

**M.** AUGUSTE CHOISY, the distinguished French writer on architecture, to whom the Royal Gold Medal has been awarded this year by the Institute, was a student in the Ecole Polytechnique in Paris, and, passing out very high in the examination list of that school, he elected to enter the service of the Ponts et Chaussées, which holds a higher rank than that of the Engineers or Artillery. He had already at an early date employed his leisure time in archaeological research, devoting his attention specially to the methods of construction employed in ancient times, a study for which his career in the Ecole Polytechnique peculiarly fitted him; and some of his essays communicated to the French Academy received the warm approval of its members. One of the results of these studies was his appointment as "professeur-adjoint" in the History of Architecture of

the Ecole Polytechnique in collaboration with M. de Darstein, the senior professor.

The earliest mention recorded in print of his researches will be found in Viollet-le-Duc's "Dictionnaire Raisonné de l'Architecture Française," Vol. IX, published in 1868, under the article "Voute." On page 477 is entered the following note, which we quote in full, as it shows the line of study which M. Choisy had selected for investigation:—

"Un jeune ingénieur français, M. Choisy, va publier prochainement un travail très complet sur la structure des voutes Romaines, d'après les monuments. Le recueil que nous avons eu entre les mains, donne au détail les divers procédés employés par ces grands constructeurs, et démontre, de la manière la plus évidente, que l'économie dans la dépense était une de leurs principales préoccupations. Nous engageons les architectes, qui veulent sérieusement connaître les procédés employés par les Romains dans les constructions à recourir aux travaux de M. Choisy sur cette matière."

We gather from this note that M. Choisy's researches became known to Viollet-le-Duc, who, when writing his article on vaulting, recognized that the principles underlying the construction of the Gothic vault had already been followed in Roman work, with this exception, that in the latter style the supporting ribs were concealed in the vaulted mass, whilst in the former style they were not only made prominent features, but in their development evolved a new style. Already, in the fourth volume of the dictionary, published in 1859, under the article "Construction," page 2, Viollet-le-Duc had shown that he was acquainted generally with some of the principles of the Roman vault, but M. Choisy's interpretation and the minute and detailed observations which he had made enabled him to carry the subject much further in 1868 than he had been able to do in 1859, although it went outside the sphere of his dictionary. It is quite certain that there was no one to whom M. Choisy's researches would appeal more strongly than to Viollet-le-Duc, with his powerful reasoning faculties. M. Choisy's work, "L'Art de Bâtir chez les Romains," was, however, not published till five years later, viz., in 1873, so that it would seem that his professional duties on the one hand, and his desire on the other to make his researches as complete as possible, prevented an earlier issue.

The economy in expense which Viollet-le-Duc in his note says was one of the Roman masons' principal preoccupations referred mainly to that of the centering employed for these immense vaults, and this had only been recognized to a certain extent by Viollet-le-Duc in 1859, if we may judge by his statement, page 2, Vol. IV. M. Choisy's notes showed that the brick arches were not continuous, but, as shown on page 466, Vol. IX, in Viollet-le-Duc's drawing, Fig. 1, were erected over special centres only, and held together at intervals by bands of brick on edge, the bricks in question measuring about 1 ft. 6 in. square and 2 in. thick. M. Choisy's second discovery, however, was even more important, for he showed that in the erection of these great vaults the first task undertaken was the construction of what was virtually only a shell consisting of two courses of Roman bricks laid in cement and breaking bond, which were laid direct on the boards carried by the centres. It was on the top of this shell that the brick arches and ties were built, the value of this shell becoming apparent in the next process, when the spaces between the ribs and ties were filled in with pozzolana concrete laid in horizontal beds. The shell, together with the centering, was sufficiently strong, on account of its arched form, to bear the superincumbent weight, and the trouble which might have been caused by the twisting of the boards if the wet concrete had been laid on them was disposed of by the employment of the shell. Viollet-le-Duc's drawing only shows one layer of bricks, but M. Choisy, in his work, "L'Art de Bâtir chez les Romains," proves that they were invariably in two thicknesses, with considerable variety in their method of breaking joint. M. Choisy's researches in this one constructional feature are of great interest and value, and so convincing in their proofs that they have been universally accepted. The economy of centering is also shown in the diagonal ribs of the Palatine Palace vaults and in those of the arch of Janus in the Forum Boarium and of the Thermæ of Diocletian. In each case one of the diagonal ribs was built first and the centering shifted to build the second, proved by its butting up against the first. These questions, however, constitute only a small portion of the information given respecting the construction of Roman buildings.

M. Choisy's next research would appear to have been in that

of Byzantine construction, and in his work, "L'Art de Batir chez les Byzantins," published ten years later, he, applying the same principle of observation, worked out the schemes employed in the construction of the vaults throughout Greece, Asia Minor, Constantinople, and Syria, a subject which had never been treated before, and his book to this day is still the only authority. His studies in Greece led him to an inquiry into the interpretation of various inscriptions found there on marble slabs, for, just as the Egyptians wrote their records and accounts on papyri and the Assyrians on terra-cotta tablets, the Greeks inscribed theirs on marble. In 1882 a marble slab was discovered near Athens on which was written in *ninety-seven lines of text the complete specification for the building of the Arsenal at the Piræus*. In his "Etudes sur l'Architecture Grecque," published in 1883-4, M. Choisy translated this inscription and illustrated its reading by a conjectural restoration of this arsenal, which not only followed the clear description given, but constituted a lesson in the methods employed by the Greeks in the construction of their timber roofs; a lesson all the more valuable because, on account of their ephemeral character, no examples have come down to us. In the same work also he published an illustration of the construction of the roof of the long wall leading to Athens, also derived from an inscribed slab. Another inscription related to the work required for the completion of the Erechtheum, which for various reasons had been delayed, and here he was able to restore conjecturally the marble roof of that temple and to describe portions of its architectural features which were comparatively unknown.

The lectures which for many years M. Choisy had been delivering at the Ecole Polytechnique probably laid the foundation for his next work, "A History of Architecture," which was published in 1898-99. This work, though confined to two modest Imperial octavo volumes, contains the pick of what might easily be extended to a dozen or more, as it commences with Egyptian architecture, passes in review all subsequent styles, including Indian and Chinese, and terminates with the Renaissance to the end of the XVIIIth century. There is, unfortunately, no preface, which is the godsend for reviewers, and probably on that account it has been so far insufficiently reviewed here in England. The historical and chronological portions are very brief, M. Choisy's object would seem to have centred more, firstly, in the systems of construction employed by different nations and in all times; secondly, in the constructive and decorative forms found in each style; and, lastly, the principal monuments. The chapters describing the various styles follow chronologically and, consequently, also the gradual developments, but M. Choisy seems to have felt that if he once commenced the usual historical account his book would have extended to many more volumes. He has made up for this deficiency, if it is one, by the drawings which he specially prepared for the work; and these drawings have this exceptional interest, that they represent clearly in the fewest possible lines all the principles of the forms or features he is describing. In the series of about thirty drawings illustrating Romanesque architecture in France he conveys more information than is found sometimes in a folio volume. The drawing of Notre Dame du Port, Clermont, Fig. 30, page 230, Vol. II., is not only extremely beautiful in its lines, but the isometrical view given represents plan, section, and perspective all in one illustration. M. Choisy's last work, published this year, goes back to the earliest style. In "L'Art de Batir chez les Egyptiens" he returns again to some of the theories put forward in his "History," but he develops them farther, and, among other subjects, his description of the method employed in the building of the Pyramids and of the immense temples at Thebes, with the clear proofs he gives at every step, is one of the most brilliant results of his inquiring mind. M. Choisy follows most worthily, therefore, in the wake of one of his predecessors, M. Viollet-le-Duc, who, in 1864, forty years ago, received the Royal Gold Medal "for his works tending to promote or facilitate the knowledge of architecture or the various branches of science connected therewith."—*The Builder*.

#### MORALS AND ART.

THE controversy in New York between Signor Biondi, the sculptor, and the trustees of the Metropolitan Museum of Fine Arts has a genuine interest for the country at large, because the museum is really a national institution, and also because the great problem involved is brought sharply home to managers and directors of every collection of pictures, sculpture and objects of art in every city and town in the world. From the dawn of art to the present day the question has been asked, What is the relation of morals to art? And this is the subject of debate

in New York, with prospect of long litigation, unless the museum retraces its steps, drags Biondi's group, "The Saturnalia," from the basement, and exhibits it in full view of the public for one year.

The "Saturnalia" took the Grand Prix at Paris and high awards at the Buffalo Exposition; the sculptors of New York do not dispute the technical excellence of the artist's handiwork; there is life, passion, and meaning in the faces; the grouping is effective, the relation of the figures in this striking and vigorous work, the one to the other, is harmonious, and they all severally combine to make a strong, complete whole.

But the riot of drunken men and women, the utter deviltry and baseness suggested in the faces and attitudes of the debauchees, all contrived with force, accuracy, and high mastery of detail and technic, are, say the American judges, immoral. The group, notwithstanding the sculptor's professed object to enforce the lesson that sensuality and debauchery bring their own dire penalties, reaches its end by paths which are not approved by an American public or by American artists.

The old issue is thus pretty clearly defined, What has art got to do with morals? In the ateliers of Paris, in the Latin Quarter, in the books of a vast number of intelligent and brilliant writers on æsthetics, the answer has been given with much emphasis that morals have nothing whatever to do with art. The moral element of life is as necessary, they will admit, to the health of the human race as ozone is to the lungs, but art and morals are two entirely different and separate affairs. Even old Aristotle cited the case of, as one would say, "a perfect thief"; the doctors will say of a blemish in the human anatomy that "this is a beautiful sore," and so critics of that school will contend that in the world of art it is only a crude Philistinism which has a quarrel with any faithful representation of life or nature that is skillfully and faithfully done. They resent the trammels which a too conscious and conscientious—or, as they would say, prudish and hypocritical—audience insists on throwing about their opportunities to depict life as it is—to mirror nature. Thackeray, for instance, though he was by no means an "art for art's sake" kind of a man, complained mournfully enough in his "English Humorists" that not an English writer since Fielding had dared to paint in novels the English people as they really were.

These considerations bring to view the great problem of the fine arts in their relation to life. What is, or should be, the underlying purpose of the artist, whether novelist, painter or sculptor? Is it merely to mirror nature as faithfully as may be? Shall we keep honor on the man who with infinite pains merely gives a transcript of the dark corners, and who makes us feel, for instance, that we have really walked through the haunts of vice and have felt the horror of the murder alley? The answer, according to idealists, is that unless that artist makes us resolve to do away with the slum he is not a noble artist. Of all the definitions of the artist and his aims, perhaps one of the best was given by Goethe, who was an "artist" if ever one lived, and of the type of the universal cultivated man. He said:

"The highest problem of every art is by means of appearances, to produce the illusion of a loftier reality."

It will be seen that the use of the word "loftier" indicates that Goethe thought the artist had a mission; he is the interpreter of life and nature; he is a teacher of the high and beautiful in humanity to the public. If the artist works with repulsive or questionable subjects, he must have in view that certain end and purpose which Hume declared to be inseparable from the work of every true artist. That end must be a lofty one, and he must so subdue his subject and his questionable materials to his purpose that the grand result will be the beauty which is not alone truth, but is also the "good."

All this academic discussion, which has gone on for ages and will go on for ages to come, has really little to do with the particular question whether Biondi's "Saturnalia" is a good thing to display in the Metropolitan Museum. At the Salon, in an exhibition of contemporary sculpture, where the interest is not in the subject, but in the technical achievement, it was in the right place. In a public museum, designed for the edification of the general taste and frequented by uninstructed people who would or could look upon it not as a piece of sculpture merely, but as the representation of a revolting scene, it would be as clearly in the wrong place. There is no prudery nor Philistinism in this. The directors of such an institution can incur no obligation to an individual artist that will weigh against their public responsibility.—*Philadelphia Ledger*.

## ILLUSTRATIONS

[Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.]

COMPETITIVE DESIGN FOR A MEMORIAL CONTINENTAL HALL FOR THE NATIONAL SOCIETY DAUGHTERS OF THE AMERICAN REVOLUTION, WASHINGTON, D. C. MESSRS. C. H. ALDEN, JR.; CALVIN KIESSLING; L. B. ABBOTT, ARCHITECTS, BOSTON, MASS.

THE purpose of this competition was to obtain designs for a building which would be a monument to the heroic men and women of the Revolution as well as an administration building for the Society. The building was required to contain: An Auditorium, which was to be the main feature of the building, and offices, etc., for carrying on the Society's work. Thirteen columns emblematic of the thirteen original states was required to be a feature of the design.

The competition was open to architects introduced by members of the society. This design was one of eight selected by the professional adviser for final consideration. The following description was submitted with the drawings:

"The Auditorium has been given a level floor as best suited to the different purposes for which it may be used. A floor sloping towards the stage can be substituted without materially altering the design. The stage can then be on the level of the corridors. If the level floor is retained, a temporary sloped floor can be erected upon it.

"The general form given the Auditorium is founded on satisfactory acoustic principles. For heating and ventilation, fresh air can be introduced in centre of ceiling and withdrawn through vents at bottom of walls, so that floor area is unobstructed.

"The thirteen columns, as the main feature of the design, are treated as a decorative motive set off by simple wall surfaces. This Colonnade expresses on the exterior the Auditorium and Museum. Under the columns are medallions with the seals of the original states.

"The offices are grouped together with the exception of that for Historian General, which is placed adjacent to Library for convenience of access to historical books. The Museum is directly associated with the thirteen symbolic columns and has provision for large memorial windows.

"The Library and Board rooms are purposely removed from the portion of the building most frequented by the general public.

"The room for Curator is placed near the entrance to control the entire building. A reception room was considered a desirable addition, and is also placed near the entrance.

"Heating, ventilating and lighting plants are in the basement. Additional coat-room space is also in the basement, connected with coat-rooms on first floor. Additional toilet-rooms are in the basement, at foot of main staircases. The room for janitor is under toilet-room, at rear, near service entrance.

"The portion of building in rear of stage can be shut off from the public by doors on landings of rear staircases.

"When it is required to exclude the general public from the floor of the auditorium, foyer, committee-rooms, etc., as at meetings of the Congress, the front entrances can be reserved for delegates, etc., and those at the side can give the public access to gallery and other portions of the building."

THE JOB HAINES HOME FOR AGED PEOPLE, WATSESSING, N. J.  
MR. ERNEST GREENE, ARCHITECT, NEW YORK, N. Y.

THE DRAPERS' COMPANY'S LIBRARY, CARDIFF, WALES. MR. W. D. CAROE, ARCHITECT.

THE building here shown, which is reproduced from the pages of the *British Architect*, forms part of the large group now building for the University of South Wales.

### EXAMPLES OF AUSTRIAN IRON WORK.

THESE subjects are copied from *Zeitschrift fur Bauwesen*.

### Additional Illustrations in the International Edition.

HIGH SCHOOL, WINCHESTER, MASS. MR. HERBERT D. HALE, ARCHITECT, BOSTON, MASS.

### RIVER VIEW OF SAME.

VIADUCT OVER THE GEBSTÄTTELSTRASSE, MUNICH, BAVARIA. THE FISCHER, ARCHITECT.

THIS plate is copied from *Blatter fur Architektur*.

PARK GATES: GATEWAY, TRINITY COLLEGE, OXFORD, ENG.; GATEWAY, MONTACUTE HOUSE.

## COMMUNICATIONS

[The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.]

### "BIG BEN."

July 5th, 1904.

TO THE EDITORS OF THE AMERICAN ARCHITECT:

Sirs:—Referring to your note in your issue of July 2d, it may be of interest to point out that Messrs. Wright and Smith, in their book, "*Parliament, Past and Present*," state that "Big Ben" is named after Sir Benjamin Hall, First Commissioner of Works. The immediate occasion for giving this name to the bell is not given by these writers, but the important office Sir Benjamin Hall held was probably sufficient to entitle him to this distinction. Yours very truly,

BARR FERREE.

## NOTES AND CLIPPINGS

INVESTIGATING THE ADMINISTRATION OF THE CHANTREY FUND.—The Academy has received wholesome discipline in the appointment by the House of Lords of a committee for investigating the administration of the Chantry Fund. Lord Lytton displayed much astuteness in framing an indictment against the trustees which could not be answered by the apologists for the Academy. The practice of buying inferior works at high prices for the encouragement of British art and the convenience of Academicians will now be modified.—*I. N. F. in N. Y. Tribune*.

THE EXPLORATIONS AT ANAU.—The Carnegie Institution at Washington has received from Professor Pumpelly a preliminary report of the investigations which he is making under the auspices of the Institution on the ancient site of Anau, near Ashabad, in Russian Turkestan. He reports gratifying success, the expedition having explored over 136 feet of successive culture strata, containing at least four almost uninterrupted culture stages, extending apparently for thousands of years through the neolithic and bronze into the beginning of the iron age, and having correlated the stages of culture with important events in the physiographic history and with the introduction of irrigation.—*N. Y. Evening Post*.

THE PERPETUAL FIRE AT THE CHEQUERS INN.—The Chequers Inn, at Slapstones, near Osmotherly, must be unique among English inns in one respect. It boasts of a fire which for more than a century has never been allowed to go out. The place is a quaint little building, to which many visitors resort on account of its never extinguished fire and the turf cakes baked upon its hearth. It has been in the occupation of one family for more than a hundred years.—*Tid-Bits*.

CRITICISM AND LIBEL.—The Supreme Court of Wisconsin decided not long ago that a newspaper critic of art, music or books may bang an artist's art all he wants and still not be liable for damages, so long as he leaves the artist's personality alone. By submitting his productions to the public the producer, so the Court maintained, invites public criticism, and if the criticism is unfavorable he has no redress but to do better next time. That seemed to be an eminently fair and proper decision. In Germany, however, they order things differently; apparently, a critic over there may say anything he likes, if only an artist has once allowed his portrait to be publicly displayed. The violinist Kubelik has just lost his suit against Dr. Gehrman, musical critic



of the *Frankfurter Zeitung*, who had called him a "stupid-looking man of superfine, effeminate appearance," and bandied sundry other little personal pleasantries. The court judged that Kubelik has called for criticisms upon his personal appearance as well as upon his art by having full-length portraits of himself displayed as advertisements in show windows. To add judicial insult to the failure to prove injury, the court also submitted that "It is customary everywhere for critics to describe the personal appearance of artists for the benefit of their readers who were not present at the concert, and Kubelik probably would have been better satisfied if the description had been more satisfactory."—*Boston Transcript*.

**A SCENIC TUNNEL AT NIAGARA.**—The scenic tunnel, under the Horseshoe Falls of the Niagara, which has just been completed, was undertaken for the Niagara Falls Queen Victoria Park Commission in order to provide a perfectly safe view of the cataract from below. A shaft was sunk 127 feet and from this a tunnel was constructed, curving out under the Horseshoe Falls 800 feet. From this laterals were run into the gorge, where large observation-rooms will be constructed of glass where tourists can sit in easy chairs and look out. A large electric elevator has been put into the shaft, and from the bottom a large board walk has been constructed to the mouths of the various tunnels.—*N. Y. Tribune*.

**PROTECTING THE PURITY OF PERSIAN DYES.**—The Shah of Persia, it is said, is rigidly enforcing the law, made in 1900, forbidding to bring into the kingdom aniline dyes, whether in a dry or liquid form, as well as all coloring materials into which aniline enters as a component. Since this edict was pronounced many consignments of anilines have been confiscated. In one part of Persia, it is said, a dyer found using anilines was punished by having his right hand cut off. No one would indorse such drastic measures as that to preserve the ancient art of dyeing, but it is a comfort to feel that the beautiful rugs coveted by all people of taste are not to be permitted to give way to the machine-made and chemically dyed products of the west.—*Boston Transcript*.

**DEFERRING "THE END OF THE WORLD."**—Close to the old Augvaldaes Church on Karneon Island, Norway, and leaning toward it is a stone pillar about twenty-five feet high called the "Virgin Mary's Needle." Tradition holds that when the pillar touches the church the world will come to an end. The superstitious local preacher whenever he imagines that its point is getting nearer to the sacred building mounts the pillar, it is said, and chisels a bit off the top so as to save the world from an untimely end.—*Exchange*.

**RESTORATION OF THE ATHENIAN STADIUM.**—The restoration of the famous Stadium, of Athens, begun in 1895, with funds given by a Greek merchant, has progressed until they are now placing the last of the 52,000 marble seats which the great amphitheatre contains. The seats, railings, etc., are all of the creamy white Pentelicon marble. It is the intention of the committee having the restoration in charge to build a marble propylæa, or entrance, resembling the ancient one. Some urge the finishing of the outer walls of the Stadium by surmounting them with a marble colonnade. When the propylæa will be commenced is not known.—*New York Tribune*.

**ENGLISH HISTORIC OAK TREES.**—Our historic oaks are, with every great storm, diminishing in number. Dumorey's Oak, in Dorsetshire, 2,000 years old, disappeared from this cause in 1703. Wallace's Oak, at Ellerslie, was 700 years old when it was blown down some fifty years ago. We have still, however, the Cowthorpe Oak, near Wetherby, in Yorkshire, estimated to be over 1,600 years old; and William the Conqueror's Oak, in Windsor Great Park, has attained the ripe age of 1,200 years. Perhaps the finest oaks of great antiquity in the land are to be found in the dukeries. About half a mile from Welbeck Abbey is Greendale Oak, credited with 1,500 summers, and now a mere ruin sustained by props. Through its hollow interior a coach and four has been driven.—*London Chronicle*.

**RAILLESS ELECTRIC ROADS.**—"For several years," says the *Electrical Review*, "experiments have been made in Germany with railless electric roads. Among the most important are several in Westphalia and two in the vicinity of Dresden—the so-called 'Haidebahn,' connecting with an electric tramway terminus at the outskirts of the town, and the 'Koenigsstein' road starting from Koenigsstein, a town lying on the Elbe, about twelve miles above Dresden. A large proportion of the passengers carried on both lines are tourists or Sunday strollers. The Haidebahn covers a distance of 3.1 miles. Wagons run every half hour, the fare being 10 pfennigs (2.38 cents) for the shortest ride and 20 pfennigs (4.76 cents) for the full distance. The Haidebahn runs over a slightly undulating road, while the one at Koenigsstein covers about two miles of hilly highway. The speed of coaches

varies considerably with the slope of the road, not, it seems, because of a lack of motor power, but for the sake of the comfort of passengers and the reduction of wear and tear on the machinery. It seems that neither of these two lines has proved a marked success from a financial point of view, partly because located at points where travel is sparse, but mainly because of the expense in operating. The electric energy required to move cars over dirt roads exceeds by 100 per cent the power necessary to draw cars over iron rails, and this difficulty should be carefully considered by parties in the United States who contemplate similar enterprises."

**RELIGIOUS SYMBOLISM IN CHINESE ARCHITECTURE.**—Religious superstition asserts itself in Chinese architecture, and the universal sacredness of the numerals three and nine is shown in the arrangement of temple doors. There is a triple gateway to each of the halls of the imperial palace, and the same order prevails at the Ming tombs, and the sacred person of the Emperor when he was in his Peking home could only be approached, even by the highest officials, after three times three prostrations. The Temple of Heaven has a triple roof, a triple marble staircase, and all its mystic symbolisms point either to three or its multiple.—*Tid-Bits*.

**CHLOROFORMING METALS.**—Panteism, which metaphysicians say is going out of fashion, will receive a filip in the philosophical world from an extraordinary announcement made by M. Jean Becquerel at the Academy of Sciences. The statement in question refers to the mysterious N-rays which are emitted by human and other living bodies, and also by certain inanimate substances, in particular by metals. Animals put under chloroform, it has been ascertained, cease altogether to emit the rays. The emanation recurs when the effect of the anæsthetic has gone off. Death causes final cessation of the emission of N-rays. Flowers, from which also the rays emanate usually, were subjected to chloroform and likewise went to sleep, the emission ceasing, but recommencing after a time, presumably when the influence of the anæsthetic had disappeared. This is a sufficiently remarkable phenomenon, but it is nothing to the next observation reported. Similar experiments have been made with the inanimate substances which possess the property of giving out the N-rays, and, as announced in the Academy, it has actually been found that these substances behave exactly as do animate beings under the same conditions. That is to say, a metal emitting the rays in a normal state ceases to emit them when subject to chloroform vapors. In short, anæsthetics apparently will send to sleep these metals as well as flowers and animals.—*London Telegraph*.

**TRADES UNIONS' LOSS IN NUMBER.**—The *New York Labor Bulletin*, for June, just issued by the State Department of Labor, says that the first quarter of 1904 was characterized by an unusual amount of idleness among organized wage workers. The outdoor trades—building and engineering work—suffered from the extreme severity of the winter, and there was some depression in the iron and steel and wood working industries. The proportion of unionists idle during the first three months of 1904 was 14.6 per cent, as contrasted with 5.5 per cent in the corresponding period of 1903—the best year of the last decade. Of the 55,710 workers who did not work at all in January, February or March, 34,365 belonged to the building trades and 10,631 to the transport trades—chiefly lake navigation. Nearly all of this idleness was due to weather conditions, as projected building operations compared favorably with those of previous years. In New York City there was a slight falling off in the estimated cost of buildings authorized this year as compared with last year; but in Buffalo, Rochester and Syracuse the cost of projected buildings exceeded that of the corresponding period of any recent year. Extremely cold weather retarded operations until spring, and in March the dispute regarding the working hours of bricklayers' laborers threw nearly twenty thousand men out of employment. A dispute between the union lithographers and their employers resulted in a stoppage of work from March 17 to April 20, on the part of 2,118 workmen in New York City, Buffalo and Rochester. A few minor disputes at the same time added to the number of idle employees, so that at the end of March no fewer than 25,723 union workers were idle on account of disputes, and the total number idle for all causes was 103,996, or 27.2 per cent of the number reporting, as compared with 12.1 per cent a year ago. At the end of March the number of labor organizations recorded by the Bureau of Labor Statistics was 2,556, a decrease of 27 from last September. In the six months, between September and April, 143 new unions were added to the list, but in the same period 170 organizations went out of existence either by dissolution or by amalgamation with other unions. The aggregate membership of all New York unions fell only 268 short of being 400,000. This is a nominal increase of 4,134 since September. The membership of unions in the leading cities was nearly stationary, New York City alone making any substantial gain. The number of women in trades unions in March was 14,166, a decline of 600 since September.





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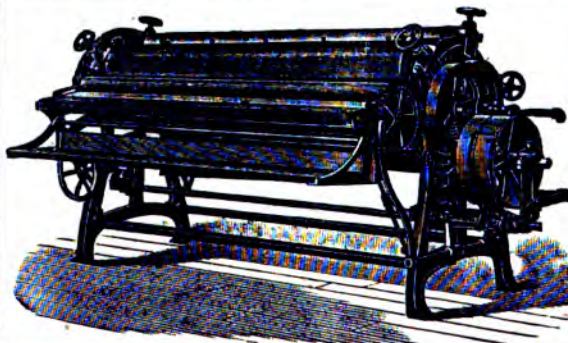
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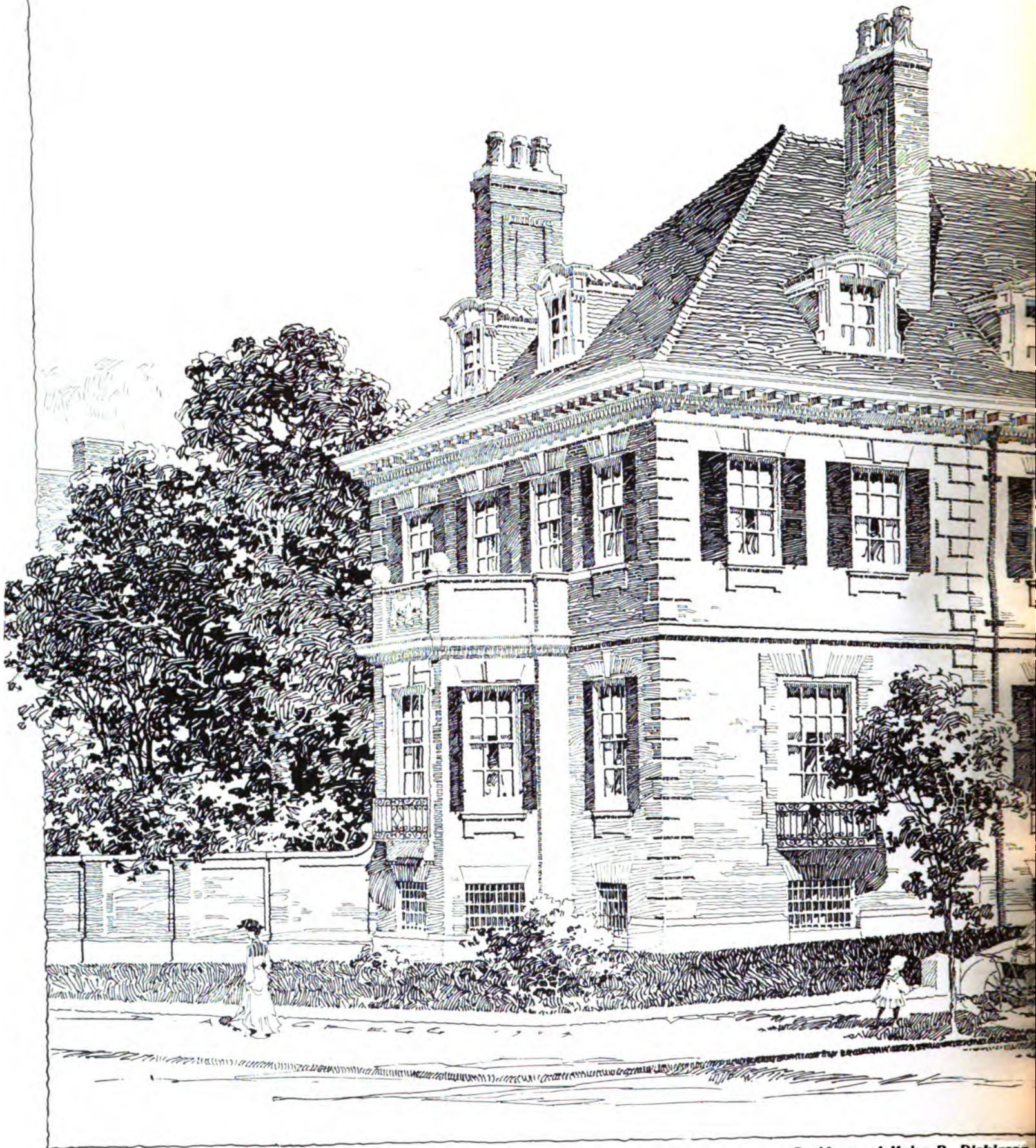
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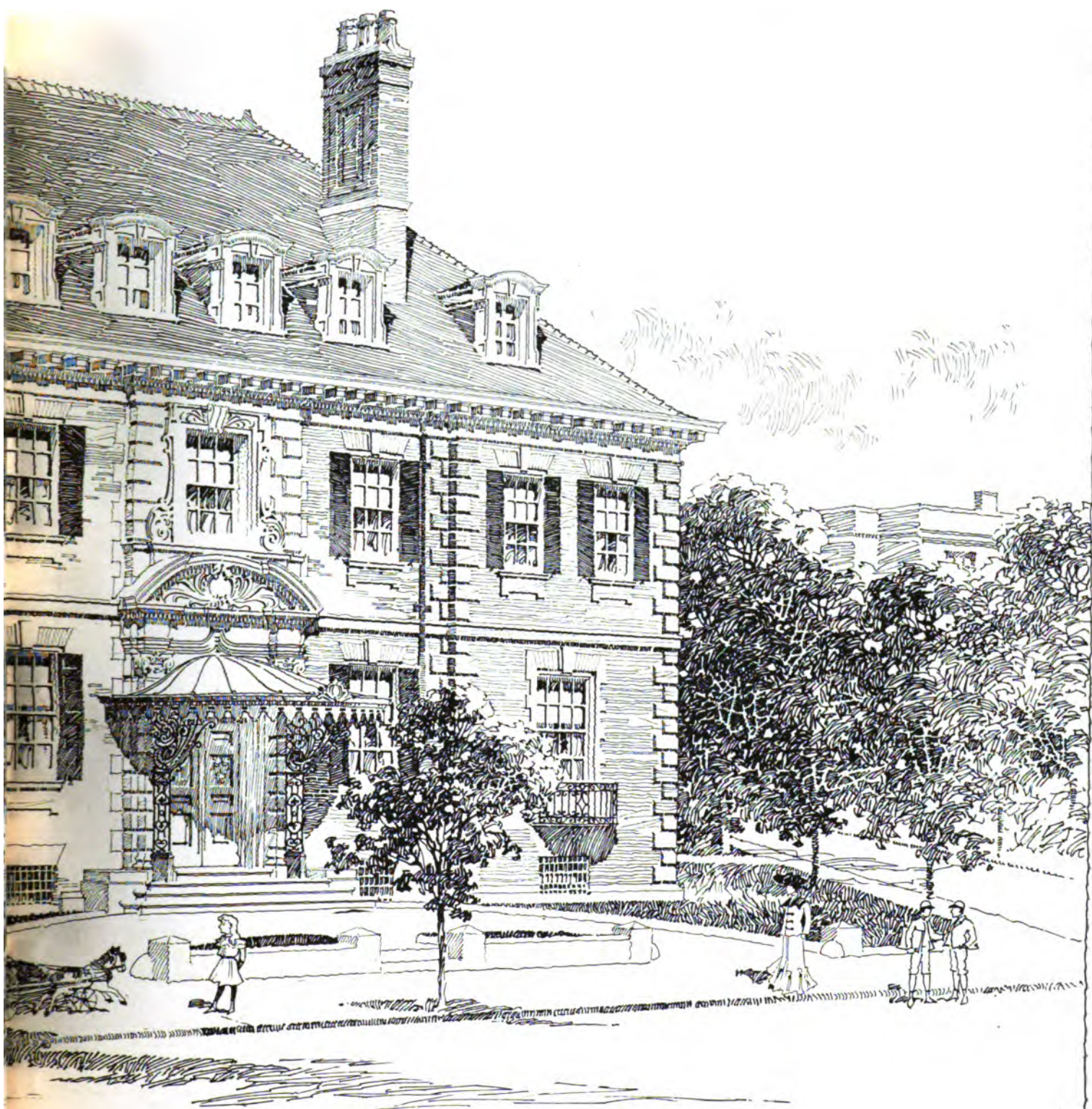






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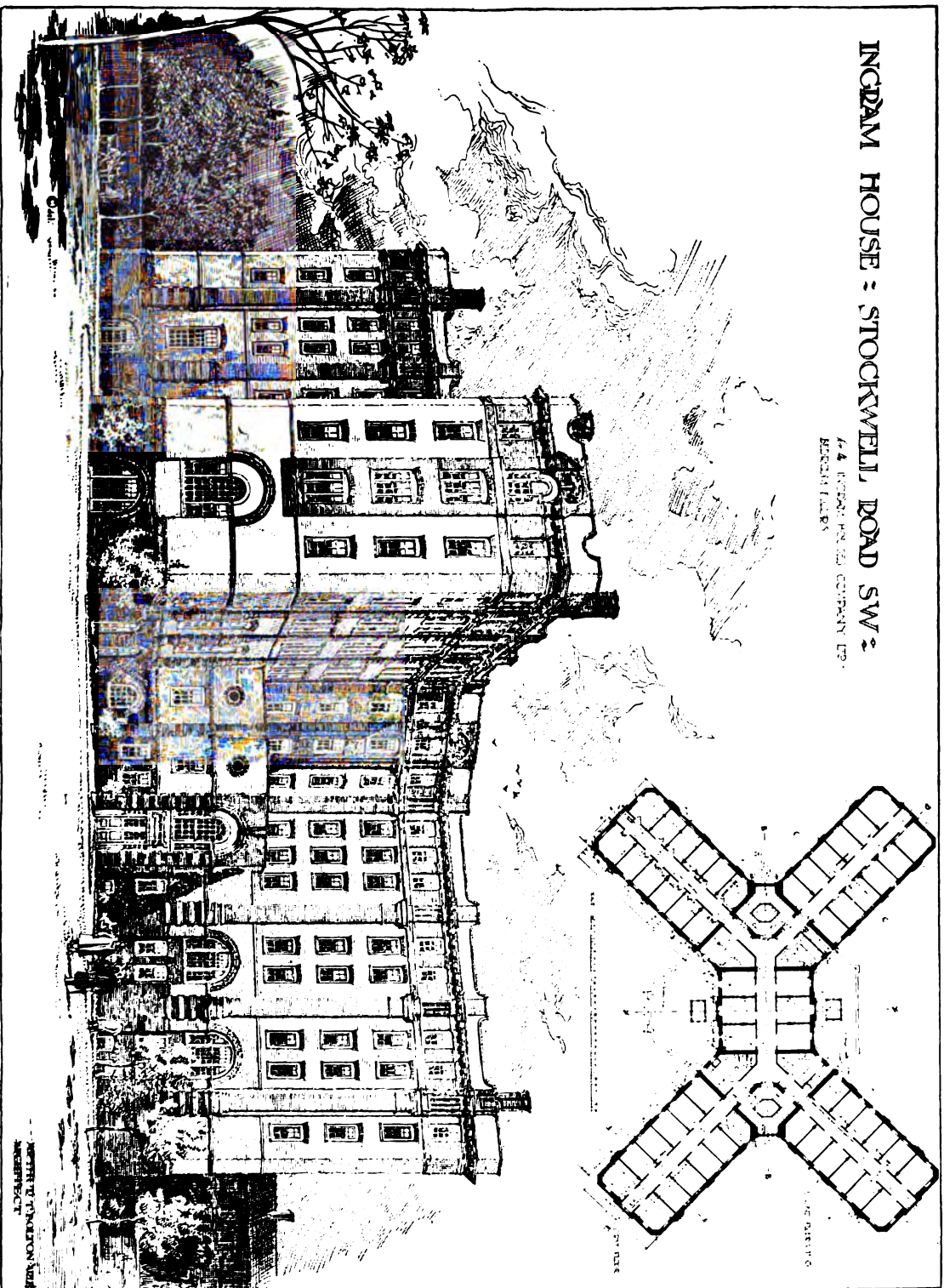
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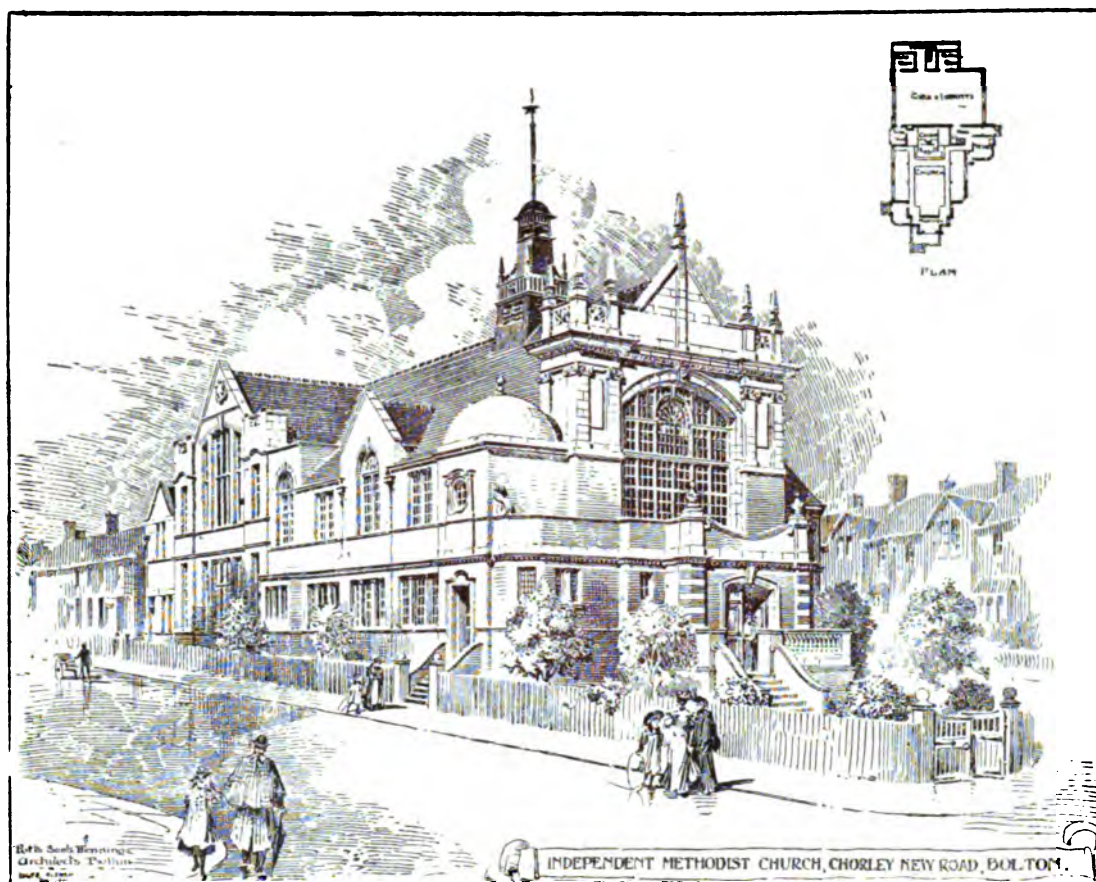


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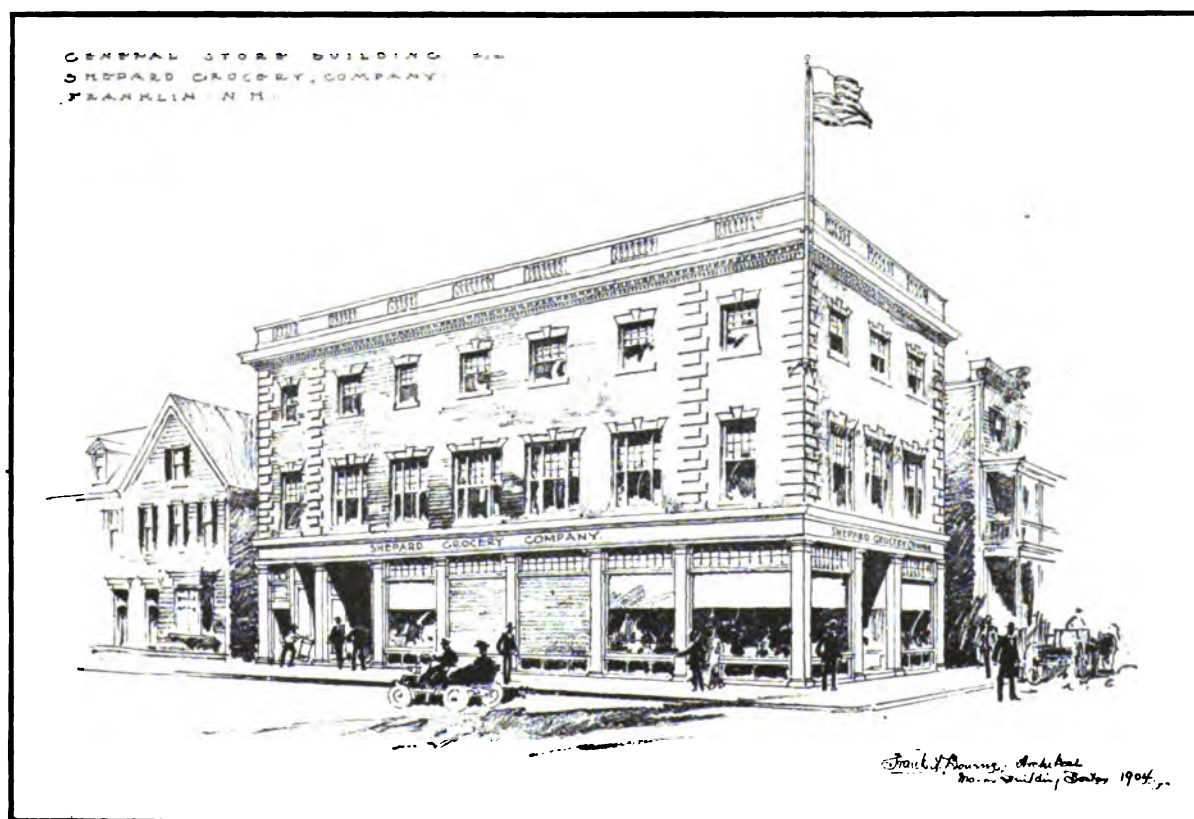


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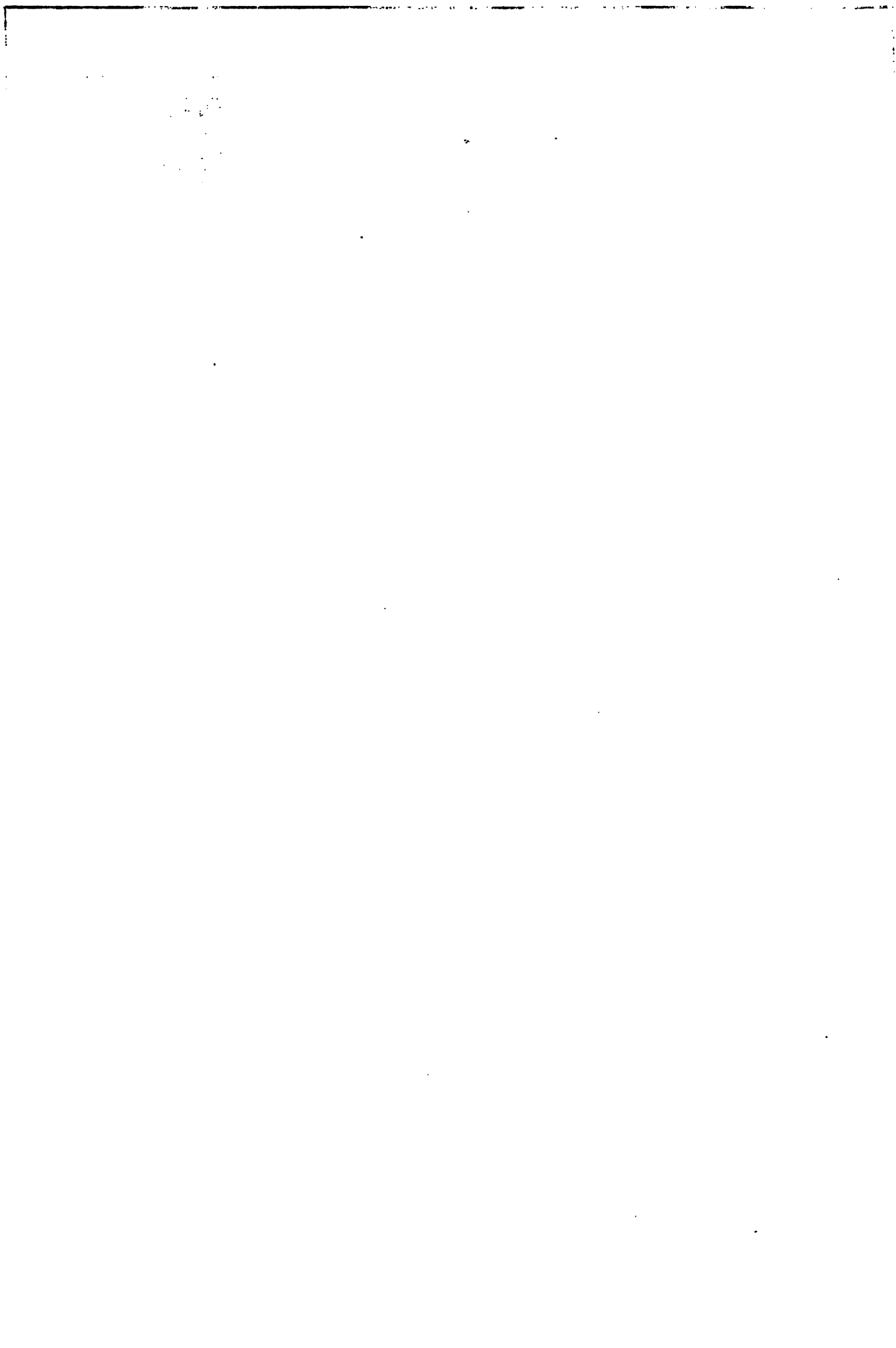
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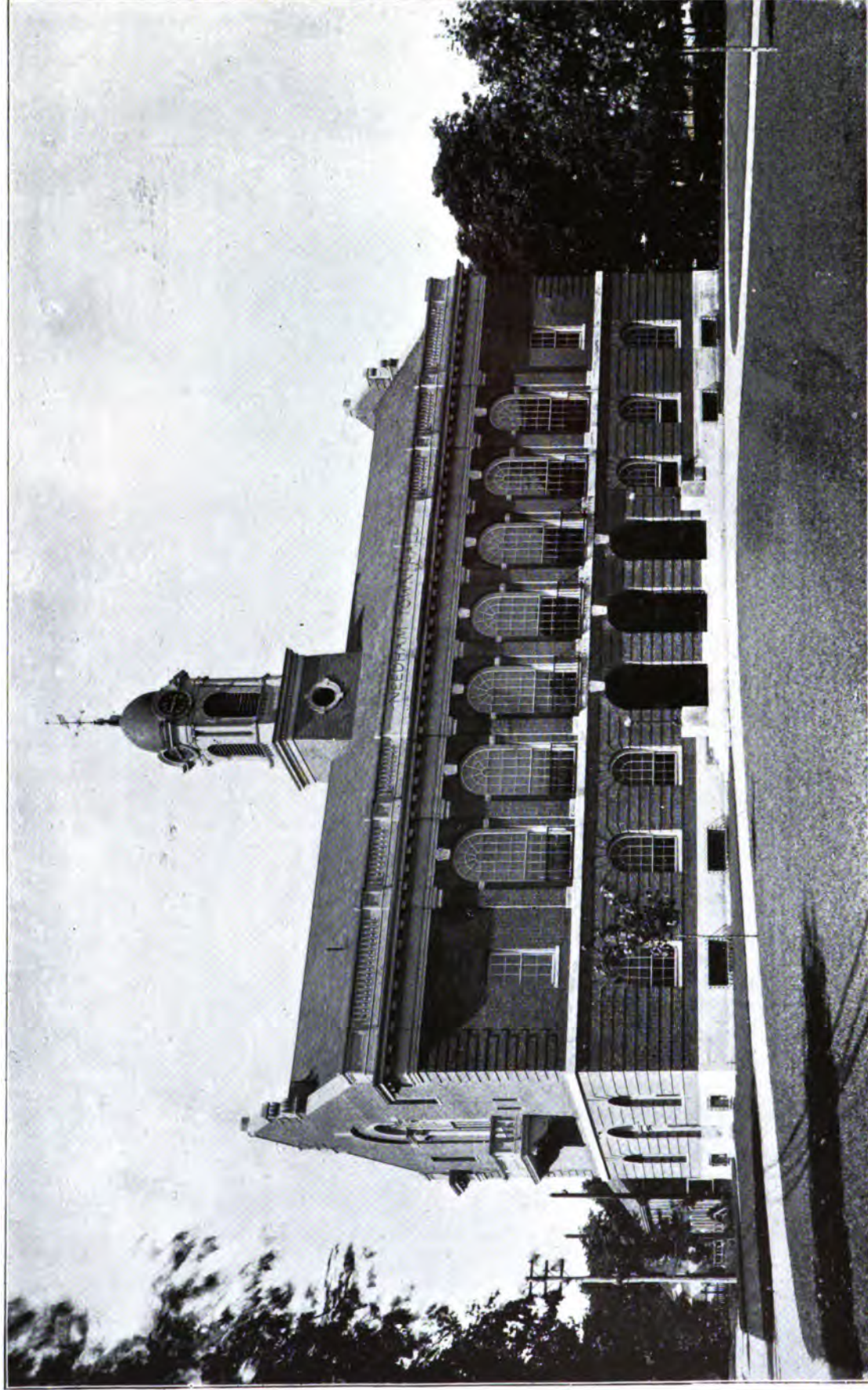
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# THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. LXXXV

SATURDAY, JULY 16, 1904

No. 1490

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**I**F Americans would but adopt one very common European custom one of the peculiarities and perplexities of our social life would be seriously and perhaps beneficially modified, and the change would, in turn, have a very great effect on architectural matters. In almost every city of this country there is a certain large section—the business section—left practically deserted after nightfall, and the thousands who peopled it by day go elsewhere to their dwelling places in other parts of the city, the residential sections. This ebb and flow of humanity constitutes the most troublesome factor in the great street traffic problem, and this factor would be almost eliminated should we adopt the European method of having living apartments and mercantile premises occupy the same buildings. It seems as if before long the up-town movement in New York must stop and begin to flow back down the island, but at a higher level, taking possession of some portion of the vast amount of unoccupied space that exists down-town after business closes. The great factory districts and the wholesale districts must probably remain purely such, as indeed is the case in European cities, but there is no good reason why the retail-shop with apartments occupying the upper stories should not be the rule in this country as it is abroad. It is the uneasy retail shop-keeper who forces the change in our cities and gradually, or rapidly to speak more truthfully, transforms one-time agreeable residential districts into business sections. He pursues his customers, and they flee from him. He might keep them around him by making the upper stories of the building he occupies attractive places of residence. To do so however would be to fly in the face of the genius of American wastefulness.

**A**LARGE part of the fire-alarms are sounded within an hour of the shutting down of work in the business section: these are for incipient fires noticed by some of the late passers through the streets,

and caused by the carelessly flung match used to light some clerk's cigar or cigarette as he hurries off to secure a place in the vehicle that is to take him to some far-away residential section. The more serious fires that declare themselves later are generally due to the same cause and started at the same hour but, unhappily, not chancing to be detected have had time to get under good headway before being discovered. In residential sections fires are comparatively rare and it is seldom that one gets under full headway before being discovered. It would be money in the underwriters' pockets if the universal sense of watchfulness and responsibility at all hours could be made to avail also in the business sections. But it could only be accomplished by adopting European methods and that for most cities, which can expand in any direction at will, is not likely to happen.

**B**UT people in the residential sections do not like to be driven from their chosen homes by the intrusion of the retail shop-keeper, and Boston has recently taken steps to preserve the *status quo* by a piece of legislation of very serious import, the final results of which it is not at all easy to forecast. Almost every one has seen with regret mercantile structures displacing the dwelling houses which used to surround the Common and Public Garden. People used to realize that the inhabitants of those houses had a most unusual and enjoyable outlook; they wished their own houses were equally well placed but they were not so envious as to wish that, since they could not themselves live there, nobody might have the benefit in their daily lives of the beautiful prospect in front. But that is what has resulted; the houses and their indwellers have gone and the shopmen who replace them have not time to think about and enjoy the beauties of the outlook. To check the encroachment of trade and to prevent the intrusion of sky-scrapers into the residential districts, a law was passed by the present Legislature enabling the city to define and establish for a period of fifteen years those parts of the city which shall remain residential and those which shall be business sections. The touchstone used in determining this question was the height-limit, and the law was drawn so as to allow the maximum height, one hundred and twenty-five feet, fixed by the present building-law to have application, as now, to the new business sections or "A districts," while a new maximum of eighty feet was fixed for the new residential sections or "B districts."

**T**HE commission appointed by the Mayor went about its work in a very thorough way and occupied several weeks in taking testimony at advertised "hearings," each hearing being devoted to a different ward of the city in succession, so that the peculiar needs of each part of the city might be weighed on the evidence of those most familiar with its conditions and needs. Curiously enough these hearings, though well advertised and each causing some discussion in the

daily papers, seem not to have attracted to them as large gatherings of interested people as one would naturally have looked for, so that the evidence presented seems to have had a good deal of the negative quality about it. The Commissioners however did their part of the work fairly and thoroughly, finally filing their report in the Registry of Deeds for Suffolk County and by so doing putting the law into actual operation, and now for fifteen years the residential districts are safe from the encroachment of the extra-high building. Naturally, now that it is almost too late, real-estate men when they come to study the boundaries and limitations discover that bars to progress have been thrown across the way at unexpected spots; but as yet they are unable to make up their minds as to whether this checking of a progress that they are pleased to consider normal and natural may not actually produce a stagnation in real estate and building operations that may prove very unfortunate for the city as a whole. The law, however, allows a period of thirty days for the filing of objections to the new limits and the commission then has six months in which to decide whether it has been shown to be desirable to make any changes.

**T**HE necessity, to which we referred the other day, of being constantly awake as to the steps our law-makers are thinking of taking, is well instanced by what has recently happened in San Francisco. It has seemingly needed the active protest of the San Francisco Chapter of the American Institute of Architects to prevent the Board of Supervisors—functionaries whose precise duties we are unacquainted with—from enacting that henceforward all schoolhouses in the city must be designed “in the Mission style of architecture.” Everyone, probably, would agree that the old Mission church and its surrounding buildings are picturesque and architecturally interesting, and many would feel that some of the modern adaptations of this phase of a style in the designing of small buildings of the ranch or hacienda type have been very charming and successful. Having assented to these heads, architects generally would be apt to agree that, except in the igloo of Greenland or the pyramid of Egypt, it would be hard to find a type of building less adapted to modern scholastic purposes than these same Mission buildings. The originator of this idea, of course, could not have known that an attempt to design a modern schoolhouse “in the Mission style” must result simply in producing, effectively, a Jacobean building, and that is not what he was aiming at.

**T**HE advocates of municipal ownership who find in their theories a cure for most of the ills that afflict the public, we believe have pretty generally neglected to explain how the matter of damages for personal injury is to be handled. At present a person who suffers injury at the hands of any chartered corporation is reasonably sure of being able to collect damages, “handsome damages” if the matter happens to be left to a jury and the circumstances attending the accident are in any degree pathetic. How will it be when damages have to be paid out of the public purse and this replenished for the purpose directly from the pockets of the public itself? We fear that, were Boston, for instance, called on to defend as many damage-

suits as are brought against the Elevated Railroad, the people would regret that they had undertaken municipal ownership of that property. Actually, municipalities are no more tender-hearted than corporations, as is shown by the city of Chicago's successfully defending a test-case for damages due to injuries at the Iroquois Theatre fire, when Socialistic theories should have constrained it to alleviate as much loss as possible by paying all claims without contest.

**I**T is curious how persistently men feel that the idea of perpetuating a man's name and deeds must be embodied in a monument or statue, or at least a tablet. Of course, the real record is made in printer's ink in the hundreds of books and thousands of pamphlets that are found in libraries all over the world, and the erected monument is a mere reminder which often is so inadequate and ridiculous as to detract from rather than add to the reputation of the man to whom it is erected. The reputation of Major L'Enfant, the designer of the plan of Washington, is sufficiently embalmed in the printed pages of many a book and record, and, if there is need of more, the city itself answers the seeker who looks about for his monument. Still, as there are, unquestionably, people who never heard of the man or his connection with the lay-out of Washington, it is perhaps just as well that a monument to him should be erected to his further glory and for the benefit of guides and sight-seers. It seems to us, however, that there is nothing to be gained by disturbing his poor remains where they lie at Trigg's farm, just outside the city, and re-interring them beneath the proposed monument which was authorized by Congress last winter.

**F**EW things attract more attention from a sidewalk gathering nowadays than a section of old wooden water-pipe when, in some of the older towns of the country, it happens to be uncovered during some street excavation. It seems colonial, if not quite mediæval, this section of log, still sound as when laid, still capable of conducting water in purity and by nature not subject to the subtle attack of electrolysis. It is this latter fact alone that, in our eyes, gives excuse for the modern revival of the use of wooden water mains and enables us to regard a certain plant in New York State that turns out twelve hundred running feet of wooden water main—or should we say water-logged main?—each day, as engaged in a legitimate, if not quite praiseworthy, business. At the establishment in question the tree trunk is put in a lathe and the sap-wood turned off; then the log is bored so that a solid core can be extracted in a single length and this in turn is bored to yield a pipe of smaller diameter, while its core is utilized for pickets and so on. There is really very little waste in the manufacture. The bored pipe is next wound with tar-coated hoop-iron so tightly as to bite into the surface of the wood, and then is hurried to its final resting place in the trench, where it is bedded in and covered by a thick coating of hydraulic cement concrete. The one object of these several manoeuvres is to get the pipe covered up in dampness and darkness before seasoning has a chance to open cracks in it. Apparently, then, the uncovering of wooden water-mains in the future will not always disclose a piece of ancient engineering.

AN ENGINEER'S SUGGESTIONS TO FIRE UNDERWRITERS.<sup>1</sup>

I HAVE been very much interested in Capt. Sewell's statements regarding the Baltimore fire.<sup>2</sup> I have visited these ruins three times, and spent four days in slowly going through room after room of those fireproof buildings, studying the effects of the heat on different materials, and in the eighteen years that I have been studying matters of fire protection I have never before found so excellent a school in which to study, or so many object lessons for showing what structural features to avoid in the future.

It appears to me that in those buildings one can find ample demonstration that *buildings can be made fireproof*; and that it is really possible to make adequate and certain provision against the exposure hazard. We have shown to us there more clearly than ever before the temperature obtained in a great conflagration. We have building materials of almost every kind tested in their resistance to fire under very nearly the same conditions.

## TEMPERATURE OF A CONFLAGRATION.

It is of great practical importance to know what the temperature is at great fires, for we can then regulate our testing furnaces to correspond, and this temperature is marked most beautifully in almost every one of those fireproof buildings in Baltimore by the fusing points of various materials.

In the ruins of the non-fireproof buildings, we also find much that is instructive as to the degree of heat. I had the good fortune to inspect these ruins accompanied by one of the leading steel-works engineers in the country, a man whose life has largely been spent as superintendent of some of the largest plants in this country, and is, from long practical experience, thoroughly well versed in the effect of heat on metals. It was our general impression arrived at independently that the temperature attained in the non-fireproof buildings, as shown by the radius of the curvature of the bent pieces of steel and wrought iron, and the appearance of much of the wreckage, was, in general, the temperature corresponding to a dull redness; but sometimes a little more than that, where fuel and air currents were favorable, but very rarely reaching the fusion point of the most fusible cast iron, and then only on exposed corners and over areas of a few inches.

In the wrecks of the non-fireproof buildings where fused metals were found, it was impossible to say if this had occurred before the walls and floors fell, or after the damage had been done and while the heat was more concentrated and confined and the effect more like that of a furnace.

The "fireproof" wrecks gave the best opportunity for study. In order to measure this temperature in degrees of the thermometer, I went through building after building with much care, taking specimens of metals that had been partially fused. I was interested particularly in the brass of the electric fixtures. I found that only rarely did the most intense heat of that great conflagration reach the melting-point of brass. It is safe to say that out of all the pieces of brass of various kinds, attachments to typewriters, railings and desk ornaments, hinges, locks, door-knobs, safe-handles, electric fixtures, and so on, that very much less than one per cent of all the brass exposed to the full heat of the fire, in rooms where everything combustible was reduced to ashes, was heated to the point of fusion.

In rooms containing extra large quantities of papers and filing cases like those occupied by the commercial agencies, or the filing rooms of some large offices, I found numerous places where the brass had been fused.

Since the melting point of brass varies with its chemical composition, I brought home specimens, and took them to the Research Laboratory of the Massachusetts Institute of Technology to have the melting temperature of that particular brass measured. In the case of the thin rolled brass of the electroliers, an average specimen, which had been fused at one end only, showed that the extreme heat of the conflagration in the midst of the room from which it was taken was about eighteen hundred degrees Fahrenheit.

By digging around among the ashes, I could occasionally find a brass hinge or a transom fastening of brass that had been fused, but in only a few cases had their fusion point been reached. Those were of soft cast brass, and a representative specimen tested by Prof. Warren in the Technology Laboratories, showed

a melting-point of about sixteen hundred and fifty degrees Fahrenheit, as marking the extreme temperature in one of the hottest parts of the conflagration.

From observations at many points about these fireproof buildings, it appears safe to say that the extreme heat seldom exceeded 1,600 to 1,800 degrees, and was commonly less, and as one lesson from the Baltimore fire I should say that 1,700 degrees Fahrenheit maintained for one hour was a fair general standard for the testing furnace of an Underwriters' Laboratory, with about 2,100 degrees as the extreme limit over small areas and for a short time.

Another feature which very distinctly marked the extreme temperature reached was the melting of the window glass. Throughout the hottest rooms of most of the fireproofed buildings, the window glass had softened enough to bend. In only a comparatively few cases had it melted sufficiently to run freely. I remember one window in the Calvert building where the glass had apparently been heated to the point that it had run over the sill, almost as water would run, and in the *Herald* building a large sheet of wire-glass from the skylight had fallen across a bar, in about the shape that a wet limp cloth would assume.

I brought back, for test, a piece of plate-glass from the hot side of the Union Trust Company building, which had fallen onto the wheel of a copying-press, and draped itself around it in a way that served to show how soft and plastic it had been.

A laboratory measurement of the heat at which that piece of glass became softened, enough to bend in this manner, gave sixteen hundred degrees Fahrenheit. The same glass became nearly fluid at a little above 1,650 degrees Fahrenheit.

I looked particularly for evidence of the melting of cast iron in these fireproof buildings, and only in two, or possibly three, cases did I find an instance where cast iron had been heated to the fusion point.

There is much difference in the fusing points of different irons and steels according to the percentage of carbon that they contain.

At what had apparently been the hottest place in the Continental Trust Company building, and also at the Calvert Building, the corners of a cast-iron radiator had begun to yield, and in the Maryland Trust Company building there was a small corner of a copying-press on which there was also evidence of incipient fusion.

Out of the hundreds of typewriter frames that I noted among the ruins there were in all, perhaps, a half dozen where a little fusion of cast iron was apparent on the corners of the frame, but the great majority, or in nineteen out of twenty of the typewriters, the fusion point of cast iron had not been reached.

A specimen that I brought back, of partly fused cast iron from a radiator, melted at somewhere between 2,000 and 2,050 degrees Fahrenheit.

## FIRE-SHUTTERS.

A point which interested me exceedingly, in studying the Baltimore ruins, was to see whether thin wrought iron or steel plate, such as is used for covering fire-shutters, had at any point been heated to a point where its power or resistance was seriously impaired. The ordinary Underwriters' fire-shutter depends for its strength and its resistance upon its thin covering of very soft mild steel coated with tin. I examined thin sheet-steel lamp-shades, thin bands for pipe coverings, tin boxes, filing cases, and dozens of shutters themselves. In no place did I find any indication that metal of that quality had been so softened, or had reached such a heat that it would be seriously impaired for the purpose of fire-shutters, and one of the great lessons that I brought away from the Baltimore fire was that our standard tin covering for the Underwriters' shutter is all right, and that this covering material has sufficient power of resistance to withstand the fiercest heat of a great conflagration, but that we do need to find some better material than pine wood to fill it with. I also made careful examinations of copper in flashings, cornices, etc., to see if it had melted. In a few small spots in rare instances fusion had begun, but in general I found it had ample resistance to fusion, so that it can prudently be used for covering fire-shutters, where something more ornamental or weather-proof than tinned plate is desired and expense is no bar.

The Standard Underwriter Shutter of wood covered with tin did not give a very good account of itself in the Baltimore fire, and I think it can be said, without fear of serious contradiction, that the endurance of the ordinary Underwriters' shutter of tin-clad wood is limited to not more than about half an hour's endurance of a temperature of 1,500 degrees, and that this limit is often passed in the heat of an ordinary conflagration, and that

<sup>1</sup> Address of Mr. John R. Freeman, Consulting Engineer, Providence, R. I., at the Annual Banquet of the National Board of Fire Underwriters, Delmonico's, New York, May 12, 1904.

<sup>2</sup> See *American Architect* for July 9.



in many of the cases where single doors or shutters have shown up so well there has happened to be an incoming air current that has helped to cool the shutter.

The limitations of the tin-clad wooden shutter were shown at one corner of the burned district in Baltimore. A large shirt factory, whose windows were protected by wooden fire-shutters, had a very close call. By heroic efforts, with private pump and hose streams, the employes saved the factory. I took particular interest in examining those shutters, and although this was not at the hottest part of the fire, I found, in parts of the shutters at the hottest exposure, that the pine wood was charred entirely through and all gone.

This matter of better shutters is one on which we should set some of our best talent at work in the experimental way. In your excellent laboratory in Chicago there is excellent apparatus for the needed tests. Although the present shutter and the present approved form of fire-door is all right nine-tenths of the time, and perhaps nineteen-twentieths of the time, it is not all that we need in a great conflagration.

I have said that buildings can be made fireproof against bad exposures. The possibility of making them so is found largely in the development of a superior thin form of fire-shutter, and in educating the architects and owners of buildings toward building a shape of window that is easily protected by the fire-shutter, and a neat window-jamb formed to receive this shutter when folded back *inside the window*.

Windows of suitable size for all ordinary office purposes can easily be so designed that they can be protected by fire-shutters, and that the shutters when open and folded back on the inside will not be obtrusive or unsightly. When a bad exposure-fire comes the ruin of the sash and glazing can be paid for cheerfully if the contents of the building are saved.

I was very much interested in the efficiency of the plain steel-plate shutters on the inside of the windows in the Safe Deposit and Trust Company building. These kept the fire out very successfully, notwithstanding that the large non-fireproof building of the *Baltimore Sun*, which was entirely wrecked, and was one of the hottest parts of the entire conflagration, was only ten feet away. The damage was so imminent that the police ordered the men to leave the Safe Deposit Building and the heat melted the lead sash-weights within the cast-iron window-casings, destroyed the sash and glass, and chipped the brick walls, but the damage on the interior of the building was almost nothing. These steel-plate shutters were so set that they were free to expand, and they were free from ribs, and of a form not likely to warp much, and they did in fact warp but little, and the casing and jamb were of such form that this warping of the shutter off its seat did not open a wide crack, and there was no combustible material near them on the inside to receive their radiant heat.

Capt. Sewell, if I understood his remarks aright, suggested a steel shutter stiffened by ribs.

Ribs are dangerous unless very carefully designed, and attached, and, as generally applied, increase the liability to warp.

I happen to have been an eye-witness of the fire twenty or twenty-five years ago that gave to the tin-clad shutter its great start on the road to popularity. This fire was in the Pacific Mills, at Lawrence, Mass. In that case there was a tin-clad wooden fire-door, of what has since become standard construction, standing immediately beside a steel-plate shutter that was heavily ribbed on the edges. Apparently it was a fair comparative test for the two shutters. The ribbed steel shutter warped away from its bearings two inches or three inches, as I now remember it, in a way that let the fire play freely around its edges, while the tin-clad wooden shutter remained in place without warping and was in good working order when the fire was over, the tin covering intact and the wood charred only about half an inch deep. These results were published far and wide, and this gave the first great impetus to tin-clad wooden shutters.

There have since been hundreds of demonstrations of the endurance of tin-clad shutters in fires, and I have taken advantage of many opportunities to examine carefully into the conditions under which they have been exposed. The result of these examinations has been to convince me that the endurance of the tin-clad shutter is limited; that its limit of endurance is often passed; that for severe cases we do need something better than the ordinary underwriter's tin-clad wooden shutter, and that we do need something very much better than the ribbed steel shutter or the rolling jointed steel shutter.

At present the best we can do in any important case is to use two fire-shutters or fire-doors, one outside and another inside; one will receive the brunt of the onslaught, and perhaps in the

course of half an hour or an hour warp or break down; the second, shielded behind the first, will stand up to its work until any ordinary fire is over.

It seems to me that the main reason why those steel shutters in Baltimore, at the building which I have just mentioned, performed so well was that they were free from ribs, and thus became heated more uniformly, with but very slight warping; that they happened to be so fastened to a frame that they were free to expand, and their seat happened to be of such a shape that, although the shutter did warp a little, this did not open much of a crack, and that there was no combustible material close to them on the inside.

The path of safety from exposure-fires for office-buildings and the like, lies in a window casing formed so that we can attach to it a shutter of a form similar to the ordinary inside house-blind. Our ordinary business buildings have walls thick enough, so that by making the shutter in four folds, or leaves, two being hinged together, and these two in turn attached to the wall, making each fold in the shutter only about fifteen inches wide, the window will be wide enough for all practical purposes, and we can fold the shutter back within the window jamb, very much as we do the inside blind.

To do that with the present ordinary tin-clad shutter would be almost impossible, because of the thickness of that form of shutter. It can be done with a steel-plate shutter without ribs, and the radiation from the inside can be checked by some thin incombustible porous covering like asbestos board. If in our underwriters' laboratories, in our technical schools, and in our tours of survey we can direct attention to these views and urge the solution of the problem of how to make an efficient fire-shutter which shall only be three-quarters of an inch or an inch in thickness, I believe that before long the problem of protecting an office-building against exposure-fires will be found solved.

It is entirely possible to design a window opening adapted to receive a safe shutter, so that it will be just as convenient for ordinary business purposes as the type now common. I think it probable that the best place for the shutters is *inside the glass*, sacrificing the glazed sash outside them in case of any great conflagration.

#### "WATER CURTAINS" AND "WIRE-GLASS."

We hear a good deal nowadays about "water curtains," and I would like to say just a word on that, because I think there is a great deal of misapprehension about their efficiency. I would like to say a word about wire-glass also, because although in general excellent, I think there is a great misapprehension as to what wire-glass can do.

I began experimenting with wire-glass very soon after it first came out, and I have used it in numerous instances, and it is a most excellent material in its way, but it has its limitations; it has the same limitations that a water curtain has, and that is, that it does not stop the passage of radiant heat.

You all have noticed how, when you are travelling in a railway train, perhaps at sixty miles an hour, and they happen to be burning a pile of ties along the track, that although your face is directed toward your newspaper, you will feel the flash of heat passing through the car window and striking against your face as you go past that pile of burning ties. That simply illustrates the great ease and rapidity with which radiant heat passes through glass.

Now, radiant heat passes through glass with wire netting in it almost as easily as it does through any other glass, and the record made by wire-glass in a certain building in Baltimore, which is pointed to with so much pride, is, I think, simply due to the fact that it was at a place where nothing combustible was immediately behind it. If you have a stock of dry goods, or wooden ware, or baled cotton or hemp just inside a wire-glass window without shutters, and there is a hot fire across the street, these can probably be set on fire with much promptness by the radiant heat passing through the glass, and the subject should be thoroughly studied on a large scale in our underwriters' laboratories. For safety, there must be something which will stop the radiant heat, and that can only be in the form of a shutter, and, by virtue of stopping the heat, the shutter will become hot.

The case with the water curtain is very much the same as with the glass. Water is diathermous, as physicists call it—that is, radiant heat passes through water very easily.

We must, I believe, set down these stories that have been told about the efficiency of water curtains as being mainly fairy tales.

This supposed efficiency of the water curtain is another topic which I hope that some one of our underwriters' laboratories and

some of our schools of applied science will take up and investigate with precision of measurement.

I have heard stories of the wonderful efficiency of the water curtain, but I must beg to disbelieve them, largely on theoretical grounds as yet. It is a matter which can be tested very easily.

The window sprinkler came in for a good deal of praise in certain quarters in Baltimore. I took particular pains to investigate that, because I wanted to find just how far they merited it, and I have no doubt they did some good, but they are not entitled to anything like the glory that is claimed for them. They will tell you a great deal about the remarkable work done by the window sprinklers in the Toronto fire. Now, I sent a bright young engineer up there especially to investigate that question and to go into it in detail, and to take photographs of the individual windows and to get right down to the bed-rock facts, and, from the mass of evidence that he brings back, I do not doubt that they did some good; but the inside ordinary automatic sprinkler near each of these windows did very much more good.

In short, if you want to provide against an exposure-fire, I believe that the only way to do it is:

First, by a wall either of brick or cement concrete.

Second, by properly designed window openings and window casings; and,

Third, by good shutters in those windows.

In the absence of shutters, automatic sprinklers, supplemented by heroic efforts with hose streams on the inside, may sometimes save the day, with great expense for water damage; but where exposures are bad, a good shutter on a proper window should be the first care of architect and owner.

#### FIRE RESISTANCE AND PLASTER OF PARIS COMPOUNDS.

I have a word to say about "limotile" [lime of teil] and about plaster of Paris or gypsum mortar for interior finish. In going from room to room in the different buildings in Baltimore, it was very noticeable how completely plastering, of which gypsum or plaster of Paris was the base, had peeled off. The complete failure of "limotile" was also very interesting. I brought back some samples of the "limotile" from the Equitable building and from the *Herald* building for analysis and fire test. It was found that this "limotile" was about 33 per cent plaster of Paris and the remainder apparently coal ashes, with perhaps some sand. Plaster of Paris gives off its water of combination under a heat slightly below 500 degrees Fahrenheit. That is a very moderate temperature for a fire, and away below the temperature found in most rooms that are well on fire.

Anything that will go to pieces at 500 degrees temperature is unworthy of being classed as a fire-retarding material.

The resistance to heat offered by plaster of Paris compounds used as mortars is a most fruitful topic for study in our laboratories.

I was particularly struck by the weakness of the "limotile" partitions in the Equitable building, and if anyone will go through the Equitable building and see how thoroughly those "limotile" partitions failed, how the "limotile" ceiling failed, they will have such an ample practical demonstration that, in their case, no laboratory test will be needed as to the folly of depending on any material for fireproofing which is largely composed of plaster of Paris.

#### FIRE RESISTANCE OF PORTLAND CEMENT.

The behavior of Portland-cement compounds was in marked contrast to the plaster of Paris compounds.

We are just now entering upon what in engineering may be termed the Portland Cement Age. It is remarkable that in all these years that we have been using this material, it is only within the past five or ten years that we have begun to duly appreciate its real possibilities.

After studying the Baltimore ruins, I am very optimistic on the fire-resisting quality of Portland-cement construction, more so than Captain Sewell is, I suspect, from some of his remarks of a few moments ago. One great advantage of Portland-cement concrete construction is that if you put it in wet and soft, and almost semi-fluid, it will fill the voids and leave no bad "blow-holes" or cavities, even under mediocre care and incompetent supervision. The careless workman thus has less chance to get a poor joint than in brickwork. With the modern finely-ground cements, if a slight excess of cement is used above that theoretically needed to fill the voids between the grains of sand, and, if the whole is thoroughly mixed, as it can be easily by modern machines for this purpose, it excludes air and moisture and opportunity for corrosion. The Portland-cement concrete pos-

sesses far greater tensile strength and shearing strength than the best brickwork, and, in brief, I believe that it presents a material for fire-resisting construction which is not excelled by anything yet known.

Some experiments have been recently carried on in Boston which indicate that Portland cement is the best known substance for protecting steel against corrosion, and I have been very glad this evening to hear Captain Sewell speak such a good word for filling everything around the steel frame up solid with cement mortar—putting it around the main steel columns of buildings—placing the cement everywhere in close contact with the steel.

That air spaces around steel frames are a delusion and a snare was shown repeatedly in the Baltimore fire; and there is no way in which you can so thoroughly protect your steel work against corrosion, no way in which you can come so near to making a tall steel skeleton building endure like one of the pyramids of Egypt, as to thoroughly encase the steel work in good, rich Portland-cement concrete. The excess of alkali seems to be just what is needed to prevent the tendency to corrosion.

In my practice as an hydraulic engineer, I have had opportunity to inspect the condition of much steel, while it was being torn out, after from ten to twenty years' use, in cement-lined water-pipes. Presumably, every insurance man detests the cement-lined water-pipe, because of the way it gets struck by lightning, and the way it sometimes has of letting go when the man shuts off a hydrant too quickly, and because of the frequency of shut-offs for repairs in systems not originally faithfully put down, when they become old; but it has done good service in helping to teach the value of Portland cement as a preservative for steel. I have in general found that where the Portland-cement mortar was sufficiently rich in cement, and was put in close contact with the steel or iron pipe-shell, that the steel or iron was commonly as fresh and free from rust as the day it was put into the trench. The rust holes nearly all appear to come where the work has been slighted, the mortar poor, or not applied in close contact to the steel.

#### NON-CONDUCTORS IN FIREPROOF SAFES.

The general failure of the common portable fireproof safes in the Baltimore fire was very noticeable.

Here is another problem for the underwriters' laboratory staff.

The contents of fireproof safes have, perhaps, not been so frequently an article of insurance in the past as they will be in the future by those men of Baltimore who had safes in that fire. It was really a pitiable sight to go through those ruins and see the large proportion of fireproof safes that had failed to preserve their contents. More than 75 per cent, at a guess, of the common portable safes had failed. This is not to be wondered at when one considers the ordinary construction. If one will examine the magnesia steam-pipe coverings in the same rooms in which safes had failed, he will see many that were only an inch in thickness that endured well and protected what was inside. These point an easy way for preventing the heat from reaching the contents of a safe so quickly. Simply provide an inch or two of magnesia slab inside the cement structure of the safe and avoid continuity of metal to the interior.

If the gentlemen here would furnish the funds and the safes, I am sure we could promptly find half a dozen places in this country where there is already just the kind of laboratory needed for testing them. The "soaking-pit," as they call it, in any great steel-making plant, like that at Sparrows' Point, or that at South Chicago, for example, where they take the great hot ingots and store them for several hours in a great covered pit heated to a glowing yellow heat—a heat far above the temperature of a great conflagration—furnishes excellent conditions for a thorough test, with cranes of ample power for lifting the safes in and out.

Take two safes built in different ways. Put books, papers, wood, fusible alloys and a recording thermometer inside of each. Expose them to that heat for half an hour and then pull them out; or, again, for an hour and then pull them out, and then for two hours and pull them out, and much will be added to the general knowledge of how to build a safe that is safe.

It would detain you too long to hear more lessons from the Baltimore fire, but the man who is interested in studying fire-protection engineering can find no better school to-day.

A DISCOVERY AT CARTHAGE.—A statue of "Apollo" of colossal size and almost intact was discovered lately on the site of the Roman theatre at Carthage, a building which is frequently referred to by Tertullian and St. Augustine. Apuleius, the philosopher, used to declaim in the theatre.

# THE LEGAL ASPECTS OF THE TRADES UNIONS AND TRADE DISPUTES BILL, 1904.—I.\*

THIS Bill, presented by Sir Charles Dilke and supported by Mr. Keir Hardie, now before Parliament, describes itself as a bill "to legalize the peaceful conduct of trade disputes and to alter the law affecting the liability of trade union funds." The object and intended effect of the four operative sections of the Bill are hardly intelligible except to those who have followed the recent decisions of the courts in cases which have arisen out of the action of trades unions. The legalization by Parliament of trades unions in 1871, and the passing of the Conspiracy and Protection of Property Act of 1875 with the object of rendering criminal certain acts done in furthering trade disputes, have given rise to many decisions as to the civil and criminal liability to which certain actions of trades unions may expose the unions themselves or their members. In fact, it would not be going too far to say that we may find in the Acts of Parliament and in the decided cases upon this subject, if not a new branch of the common law, certainly new applications of the principles of the common law. And, as often happens, the necessity of applying those principles in some detail to new facts has brought out the full significance of the principles themselves. This bill, then, like many Acts of Parliament already on the Statute Book, is brought forward in order to change the law as it has been laid down in certain decisions of the courts. We shall state each of its sections and estimate the effect which each section may be expected to have upon the existing law.

The first section deals with the civil liability of the members of trades unions for acts interfering with a business or with existing contractual relations. It enacts that "where an act is done in contemplation or furtherance of a trade dispute, the person doing the act shall not be liable to an action on the ground that by that act he interfered, or intended to interfere, either with the exercise by another person of his right to carry on his business, or with the establishment or continuance of contractual relations between other persons; provided that nothing in this section shall exempt such person from liability on any other ground."

In the first place, we may remark that the bill contains no definition of the term "trade dispute," nor is the meaning of the term "act done in contemplation or furtherance of a trade dispute" quite obvious. Does it mean any act which actually gives rise to a "trade dispute," or an act which may reasonably be expected to give rise to such a dispute, or an act which the party doing the act thinks may give rise to such a dispute? The same terms are used in the first section of the Conspiracy and Protection of Property Act, 1875, in relation to criminal liability for conspiracy. But they have not as yet been defined,<sup>1</sup> and they may well be more difficult of definition when they come to be applied to civil actions. Clearly there is much scope for litigation in these vague terms. To understand the rest of the section it is necessary to state shortly the effect of the cases which have defined the extent to which interference with modes of business, and with the existence and establishment of contractual relations, may be carried. These cases at bottom turn upon a difficulty which the trades unions have always experienced—the difficulty of making a strike effectual when a supply of non-union labor can be obtained. This difficulty cannot be described more clearly than Lord Lindley has done in the case of *Lyons & Sons v. Wilkins*:<sup>2</sup>

"Of course one sees the difficulty in which all these trade unions find themselves. Strikes and trade unions which were formerly considered illegal have now been legalized . . . and a strike can be conducted up to a point with perfect legality. That is to say, persons can not only decline individually to work for a master except upon terms which the workmen desire to obtain, but they can combine to do that. They can combine to leave him; they can strike unless he will raise the wages up to what they desire, and trade unions which assist them in withdrawing their own labor and declining to work, and which assist them in supporting themselves during the strike, can legally do so. Then arises a difficulty, which is as well known to those who conduct trade unions as it is to the masters and to all persons who have experience in these disputes, and it may be put thus: 'If that is all we can do we may be defeated by the masters making arrangements with other people who may be willing to work

for them, either by taking the work home, or by working for less wages than we think is right, and unless we can stop that our strike may be ineffective.' Then comes the struggle. . . . Some strikes are perfectly effective by virtue of the mere strike, and other strikes are not effective unless the next step can be taken and unless other people can be prevented from taking the place of the strikers. That is the pinch of the case in trade disputes."

Under the existing law a trade union cannot prevent a man from working upon such terms as he chooses. In fact, the existing law carries out the ideas of the Royal Commission on Trade Unions, which reported in 1869: "We think," runs the report, "that whilst conceding to such workmen as desire to exercise it an extended right to combine against their employers, especial care should be taken that an equal right be secured to those workmen, who desire to keep aloof from the combination, to dispose of their labor with perfect freedom as they severally think fit. . . . The workmen who think it for their advantage to combine together in the disposal of their labor are no more justified in constraining any other workman who does not desire such association to combine with them—to bring his labor into common stock, as it were, with theirs—than an association of capitalists in constraining an individual capitalist to bring his capital into common stock with theirs; and it is the more important that the law should protect the non-unionist workman in his right to freely dispose of his labor as he thinks fit, because standing alone he is the less able to protect himself." The law as it has been laid down by recent cases may be thus summarized:

1. Peaceable persuasion, unaccompanied by threats or other unlawful action not to enter into contracts with a certain person, is perfectly lawful (*Allen v. Flood*).<sup>3</sup> A man has a perfect right, whatever be his motives, to try to persuade another either to contract or not to contract with another. As Lord Herschell put it in *Allen v. Flood*:<sup>4</sup> "A landowner persuades another to sell him a piece of land for which a neighbor is negotiating. It is so situated that it will improve the value of the property of whichever of them obtains it. His motive is to benefit himself at his neighbor's expense; he induces the owner of the land not to contract with his neighbor. Would it be possible to contend that an action lay in such a case?" In thus exercising his powers of persuasion a man is only exercising his own rights.

2. It has been laid down in a long line of cases that persuasion to interfere with existing contractual rights—persuasion, that is, to break an existing contract—is always actionable unless there is some lawful justification or excuse.<sup>5</sup> We may take as an instance of the operation of this rule a case decided last year, *Glamorgan Coal Company v. South Wales Miners' Federation*.<sup>6</sup> In that case miners employed upon collieries in South Wales abstained from working on certain days called "stop days," in breach of their contract with their employers. In so doing they acted under the orders of the Miners' Federation. The Court of Appeal held that an action lay against the Federation and its officials. The question what will amount to such a lawful justification or excuse as will justify persuasion to interfere with existing contractual rights is a difficult one. It is not difficult to put cases in which such a justification would clearly exist. For instance, if a father had discovered that his child had entered into an engagement to marry a person of immoral character he would be clearly justified in persuading the child to break his or her contract. It is hardly possible, however, to give an exhaustive definition of all the cases where such justification exists. Much must be left to the good sense of the tribunal; and in coming to a conclusion "regard might be had to the nature of the contract broken, the position of the parties to the contract, the grounds for the breach, the means employed to procure the breach, the relation of the person procuring the breach to the person who breaks the contract, and also to the object of the person in procuring the breach."<sup>7</sup> But the mere fact that the person procuring the breach had no personal animus against the person injured by the breach; the mere fact that it is to the joint interest of the person who procures the breach and of the person breaking the contract that a breach should occur, is no sufficient justification or excuse. There must exist not merely an interest; there must exist also something akin to a duty to give the advice by virtue of the relationship existing between the party who advised the breach and the person who broke the contract.

\* A paper by Professor W. S. Holdsworth, D. C. L., Barrister-at-law, published in the *Architect*.

<sup>1</sup> See remarks of Lord Lindley in *Quinn vs. Leatham*, L. R. 1901, A. C. at pp. 541, 542.

<sup>2</sup> L. R. 1896, 1 Ch. at pp. 822, 823.

<sup>3</sup> L. R. 1898, A. C. 1.

<sup>4</sup> *Ibid* at p. 127.

<sup>5</sup> The series began with *Lumley vs. Gye*, 2 E. & B. 216.

<sup>6</sup> L. R. 1903, 2 K. B. 545.

<sup>7</sup> *Ibid*. at p. 574, per Romer, L. J.

3. If persuasion either not to contract or to break an existing contract goes beyond mere persuasion, if there are elements of terrorism and coercion, an action will in all cases lie against the person who has employed such means to prevent the establishment or continuance of contractual relations. The right of action in such a case is grounded rather upon the means employed than upon the result designed. This proposition is illustrated by the case of *Quinn v. Leathem*.<sup>1</sup> In that case an action was brought against the appellant Quinn and four other defendants, all of whom were officials of the Belfast Journeyman Butchers' and Assistants' Association. The plaintiff Leathem was a fletcher who employed non-union men. For the last twenty years Munce, a butcher, had bought of Leathem about 30l. of meat weekly. The defendants threatened to call out Munce's men if he continued to buy his meat from Leathem. In consequence Munce ceased to deal with him. The House of Lords held that Leathem had a good cause of action. "The defendants," said Lord Lindley,<sup>2</sup> "were doing a great deal more than exercising their own rights; they were dictating to the plaintiff and his customers and servants what they were to do." To have denied a right of action in such a case would, in the opinion of the same learned judge, be to "hold that boycotting by trades unions in one of its most objectionable forms is lawful."<sup>3</sup> The practical effect of this decision was well summarized by Romer, L. J., in a case decided last year.<sup>4</sup> "If a person who, by virtue of his position or influence, has power to carry out his design, sets himself to the task of preventing, and succeeds in preventing, a man from obtaining or holding employment in his calling, to his injury, by reason of threats to or special influence upon the man's employers, or would-be employers, and the design was to carry out some spite against the man, or had for its object the compelling him to pay a debt or any similar object not justifying the acts against the man, then that person is liable to the man for the damage consequently suffered. The conduct of that person would be, in my opinion, such an unjustifiable molestation of the man, such an improper and inexcusable interference of the man's ordinary rights of citizenship, as to make that person liable in action."

(To be concluded.)

#### A RECENT NEW JERSEY DECISION AND THE ILLINOIS LICENSING BOARD.

It is stated in a recent publication that a decision handed down by the Supreme Court of New Jersey is being used by some papers as an argument against the laws which prevail in some States providing for the licensing of architects.

In the case referred to the Board had refused the application of Newman H. Raymond, of Jersey City, for an architect's license. The ground assigned for refusing to issue a license was that Mr. Raymond was not an architect, but merely a builder. After reviewing the facts the court set the decision of the Board aside and ordered a license to be issued. The result of this case is not to be wondered at, if one reads the law of New Jersey relating to such matters. Section 10 of the law says:

"Any person who shall at the time of the passage of this Act be engaged in the practice of architecture in this State, and who shall present to the State Board an affidavit to that effect . . . shall be entitled to receive such certificate upon the payment to the said Board of a regular fee of \$5."

It will be seen by this that the Board has no discretion in such cases, and was obliged to grant all the licenses applied for at the time the law went into effect on July 1, 1902, on presentation of an affidavit from the applicant. The New Jersey law further states in Section 12:

"Any person whose certificate shall be refused or revoked by said State Board shall have the right to appeal by *certiorari* to the Supreme Court for a review of such action, and the Supreme Court is hereby authorized and empowered to review and correct the action of said State Board, and the State Board shall forthwith carry out the judgment of the Supreme Court on such review."

The decision thus rendered under these clauses can have no bearing upon the efficiency of the Illinois law, which was passed in 1897. That law gave the State Board discretionary power in

such cases, and this discretionary power in granting licenses to those who claimed to be practising architects at the time the law went into effect was sustained by the Appellate Court of Illinois in its decision of the case of *Harbers vs. the Illinois State Board of Examiners of Architects* rendered October 2, 1900. The claim of Harbers for a license was based on exactly the same grounds as those made by Raymond in New Jersey. In its decision the court quoted the language of the law in the following sentences:

"In the language of the law a person desiring a license without an examination must by affidavit show to the satisfaction of the State Board of Examiners of Architects that he or she was engaged in the practice of the profession of architecture on the date of the passage of this act. This certainly leaves some discretion to be exercised by the Board, and while a mandamus would lie in a proper case to compel the Board to act upon an application, yet, in the absence of a wrongful abuse of power, amounting to a fraud against the rights of the applicant, it would not lie to compel its members to decide in a certain way."

Neither does this decision in New Jersey have any bearing upon the constitutionality of laws for the licensing of architects. It applies only to the individual case in question, and would not have arisen had the New Jersey Board been vested with discretionary power, as is the case in Illinois.

All attempts thus far made to dispute the authority of the Illinois Licensing Board have fallen to the ground.

PETER B. WIGHT,

Secretary Illinois State Board of Examiners of Architects.

July 6, 1904.

## ILLUSTRATIONS

[Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.]

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## NOTES & CLIPPINGS

THE SUPPLY OF FUEL PEAT.—Peat briquettes, all heat except a pinch of ashes, can now be made by improved processes for \$1.21 a ton. The peat supply increases proportionately with the distance from the equator. In cold and wet countries, the climate does not well do the drying, and methods have consequently

<sup>1</sup> 186d. 1901, A. C. 495.

<sup>2</sup> L. R. 1901, A. C. at pp. 536, 537.

<sup>3</sup> *Ibid.* at p. 542.

<sup>4</sup> *Gibson vs. National Amalgamated Laborers' Union*, L. R. 1901, 2 K. B. at p. 620.



to be resorted to. So prepared, there is peat enough distributed here and there in the world to conduct a substantial civilization on for an indefinite succession of centuries. Alaska has plenty of it, and so has Siberia, with ample deposits in other far Northern countries. Sweden already uses two million tons of the briquettes yearly, and within fifty miles of Chicago are deposits of the material sufficient to supply the city with fuel for a period to come, perhaps as long as it may have any use for fires or domestic hearths to light them on. One-seventh of the area of Ireland consists of peat bogs heretofore not to be profitably worked, but by the new process made as valuable as coal mines.—*N. Y. Tribune.*

**RECONSTRUCTING THE OLD CROTON AQUEDUCT.**—As under the new conditions incidental to the completion and filling of the new Croton reservoir, the external pressure to be resisted by the old Croton aqueduct may sometimes be twenty pounds to the square inch, it has been determined to reinforce the structure, and to replace by detours on firm ground such portions as are built on embankments. The work is being done under the supervision of J. Waldo Smith, chief engineer. The embankments are five in number, as follows: Orser's brook, 294 feet; Bailey's brook, 621 feet; Purdy's brook, 137 feet; Spring brook, 304 feet; McCord's fill, 251 feet. These detours are in reality concrete conduits, running parallel to the old aqueduct and at a distance of fifty feet from it and call for about 1,600 linear feet of new conduit to be built. There will be no reconstruction, only repairing and reinforcing of 13,800 feet of the old aqueduct lying between the old and the new dam. The old aqueduct is being repaired by replacing the brick key in the arch, where required, and laying a continuous reinforcement of concrete over the arch and in the invert. The latter work was first accomplished. The arch was cut through at points 360 feet distant from each other, and each way was built the invert reinforcement—an eight-inch layer of 1:2:4 concrete composed of "Giant" Portland cement and two-inch broken stone mixed very wet by hand. The bottom of the aqueduct was thoroughly cleaned and dried, and the concrete was bonded to the brickwork by means of holes twelve-inch in length, seven and one-half in height, and about four at the bottom, cut through the first course of bricks in the side wall. The sections in which the reinforcement was made were eight feet wide, at intervals of four feet. About five cubic feet of concrete per linear foot was used. Only in a few places in the old aqueduct was the masonry faulty, and at these spots about 150 linear feet only of new brick key has been called for. Where the old aqueduct had been reinforced by concrete, nothing was disturbed; otherwise new concrete is placed on the outside, and throughout is laid so as to form a continuous monolithic mass from springing line to springing line, with all joints made transversely to the axis of the conduit. The length of the sections is from ten to fifty feet. The concrete required in the work of reinforcement is seventeen and one-half cubic feet per linear foot, and the total amount is about 20,000 yards.—*Fire and Water Engineering.*

**"DEAD" CHURCHES IN LONDON.**—In London, as in many other large cities, the demands of church-goers for places of worship in the heart of the city are very limited. The *Express* recently investigated this matter, and its representative visited ten churches within the business limits of the City and found congregations totalling only 213 where there were seating accommodations for 3,750. The church property thus visited would bring in the market, at a moderate estimate, \$2,500,000, and there is a crying need for more churches in many of the residential sections of London, churches that could be built with this money. In one church in the heart of London, between Queen Victoria Street and Cannon Street, where there is a seating capacity of 400, the attendance at the morning service consisted of four persons—three women and one child. In another church, on Bread Street, with a seating capacity of 300, there were four men and six women. At St. Helen's, Bishopsgate, with a seating capacity of 600, only three men, six women and two children attended the morning service. In the ten so-called "dead" churches the total attendance amounted to less than 6 per cent of the seating capacity—that is, of 3,750 seats, 213 were filled and 3,537 were empty. In the light of such figures, it is not surprising that a movement has been started to sell some of these churches that occupy land valuable for other purposes, so that the money thus raised can be expended in districts where there is need for more church work and where large congregations can be gathered.—*Boston Herald.*

**RODIN AND THE LIAR.**—An American has brought from Paris a story of Rodin, the sculptor. "Rodin," he says, "received a raw daub of a painting, a month or two ago, from a conceited young student. He accepted the painting gracefully, but he was much annoyed, a week later, to hear that the student was going about declaring: 'Rodin says the painting I gave him is better than the Degas over his chimney.' Rodin decided to take down this con-

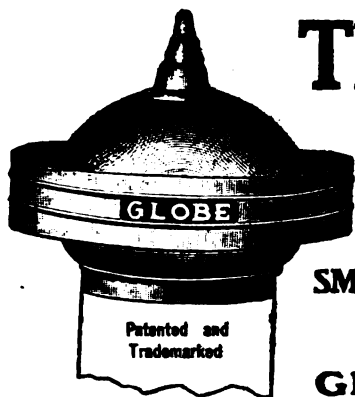
ceited young liar. So, meeting him one day at the Cafe de la Paix, he said, in the hearing of a good many mutual acquaintances: 'My house was robbed on Sunday night. Did you hear about it?' 'No,' said the youth. 'Was much taken?' 'Half a dozen suits of clothes, some silver, and—you know that painting of yours?—well, they cut it out of the frame, and—' 'Hurrah!' the youth interrupted, excited and pleased. 'Why, my fortune's made. The newspapers—' 'They cut the picture out,' Rodin continued, 'and went off with the frame.'"

**THE PROPOSED APULIAN AQUEDUCT.**—After prolonged delay the Italian Government has at last introduced the measure sanctioning construction of the Apulian aqueduct. This project consists of an irrigation system for the arid tableland of Apulia. The aqueduct is to cross the Apennines by means of a tunnel  $7\frac{1}{2}$  miles long, and will have several subsidiary canals, so that twenty-one communes of the province of Foggia, and all those of the provinces of Bari and Lecce, will receive an adequate supply of water. These communes contain a population of nearly two millions. It is estimated that the scheme will cost \$25,000,000, and will not be completed before the year 1920.—*Exchange.*

**GIANT TREE DOOMED.**—The grizzly giant of the Mariposa big-tree grove is doomed to death. Whether old age or disease is claiming it is not known, but certain it is the sap of the immense trunk is ceasing to flow and the tree is beginning to topple. "Nat" Ellery, State Highway Commissioner, says the tree is in such a rapid decline it cannot live longer than a few months. Already the tree is eighteen feet out of plumb, and is gradually sinking. The only thing that can save the tree from a sudden fall from its Tower of Pisa position is the use of wire cables, and arrangements for these have been made. The tree is the best known in the State. It is 244 feet tall and 109 feet in circumference.—*N. Y. Tribune.*

**A POWERFUL DREDGE.**—The Susquehanna Iron Company's big plant will be in operation within thirty days. It has been finished, and the great furnaces are ready for the ore. The stupendous task of digging a canal or inland harbor nearly a mile in length from the new outer harbor to the company's plant is now in progress. This canal is to be 200 feet wide and 23 feet deep. That is to say, it is to be 23 feet below the mean level of the lake, so that in some places the excavation is to be 40 feet in depth. That is quite a hole to dig in the ground a mile long, but the Buffalo Dredging Company expects to dig it and build solid cement wharves on both sides of its entire length by April 1 next. It requires great engineering skill and an enormous amount of physical power to accomplish such a task. There are 1,400 feet of it through the solid rock. Steam power and compressed air are accomplishing it. When examinations were made it was found that a strip of rock nearly a mile long, 200 feet wide and 10 feet in thickness had to be cut out. It is not shale rock or slate, but solid living rock. The Buffalo Dredging Company is ripping through that solid ledge of rock with a steam shovel. The dredge used for that purpose is the greatest tool of its kind in the world. It looks like a giant mud dredge, and is built on the same principle as an ordinary horse-power steam engine. Its anchors or spuds are made of giant Oregon fir, 53 feet long and 44 inches through. It has a dipper or dredge with a capacity of seven cubic yards. One man with a dozen levers before him operates the whole machine. The dredge of the dipper is armed with steel teeth about 15 inches long and 6 inches thick. The man at the levers drops the great dipper, with its massive handle, down 15 feet to the rock bottom. Then he moves another lever, and the big engine down in the hold gets under way. The great steel cable attached to the dipper quivers under the strain. There is a sound of ripping and tearing and grinding, as if the earth was being turned inside out, and up comes the dipper, with its enormous maw choked with huge masses of splintered rock. It has ripped up seven cubic yards, and when it has been swung over to the rock scow its mighty under jaw drops, and it spews out boulders weighing tons. The teeth of that dipper bite out seven cubic yards of rock a minute.—*Buffalo Express.*

**OLDEST CLOCK.**—The oldest working clock in Great Britain is that of Peterborough Cathedral, which dates from 1320, and is conceded to have been made by a monastic clockmaker. It is the only one now known that is wound up over an old wooden wheel. This is some twelve feet in circumference, carrying a galvanized cable about 300 feet in length, with a leaden weight of three hundredweight. The cable has to be wound up daily. The gong is the great tenor bell of the Cathedral, which weighs 32 hundredweight, and it is struck hourly by an 80-pound hammer. The going and striking parts of the clock are some yards apart, communication being by a slender wire. The clock is not fitted with a dial, but the time is indicated on the main wheel of the escapement, which goes round once in two hours. This clock is of most primitive design, more so than the famous one made for Charles V of France by Henry de Nick.—*Exchange.*



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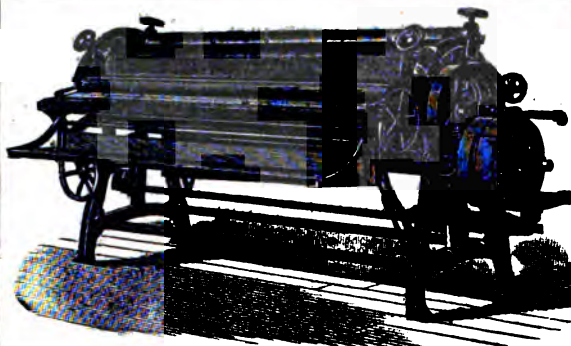
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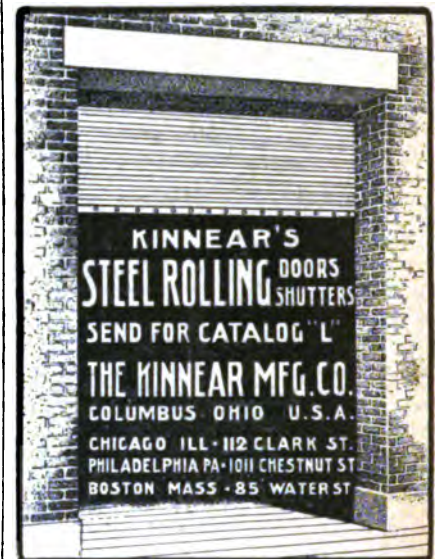
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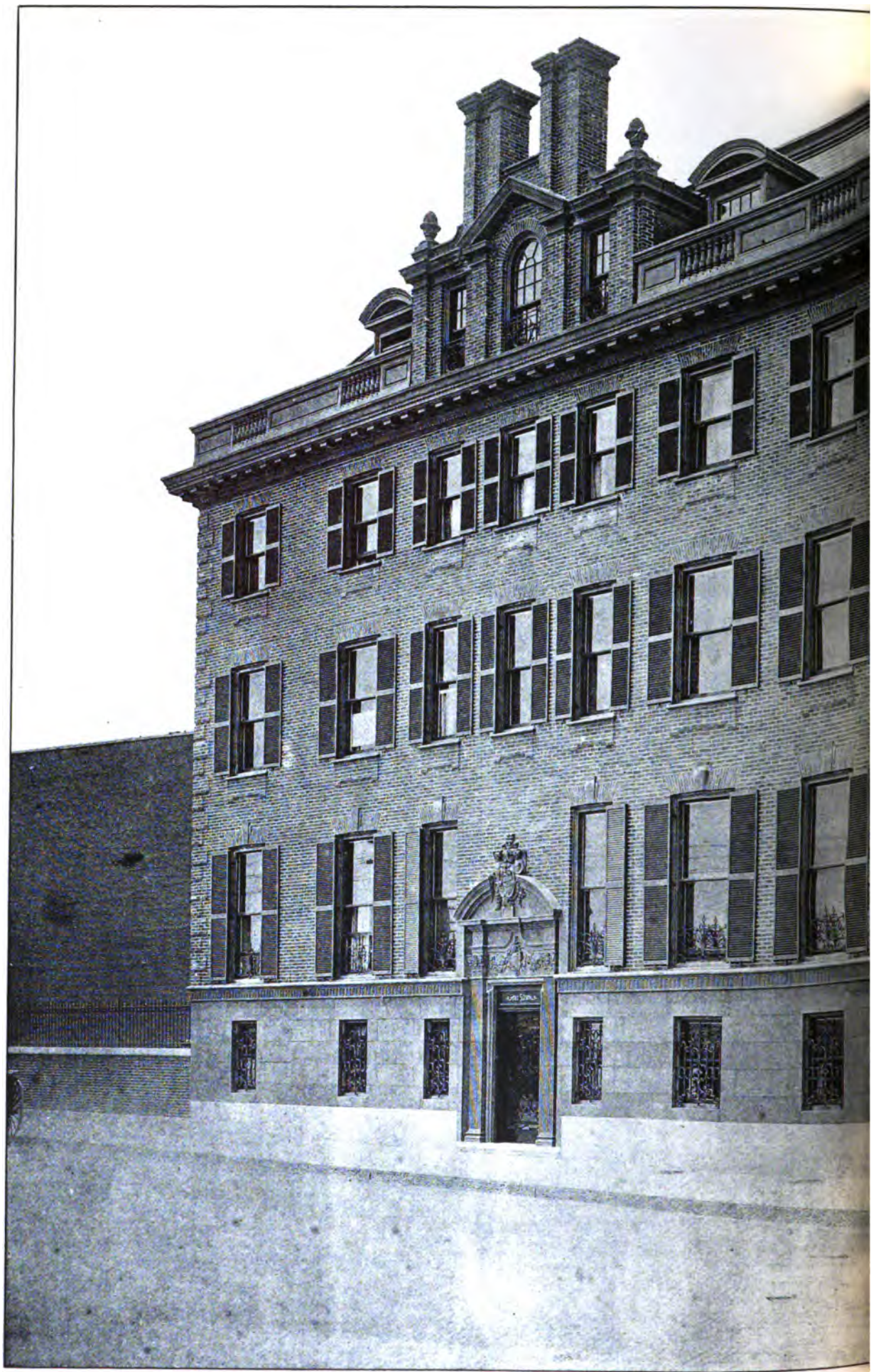
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HOUSE OF ALBERT STONE, ESQ., BAY STATE  
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ARCHITECTS.

*The American Architect*  
July 23, 1904.  
No. 1491.









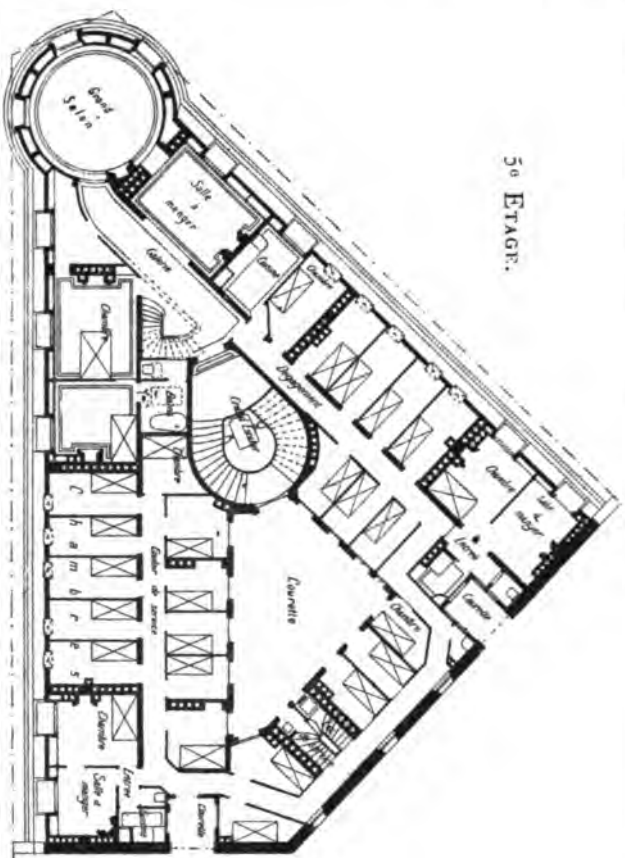
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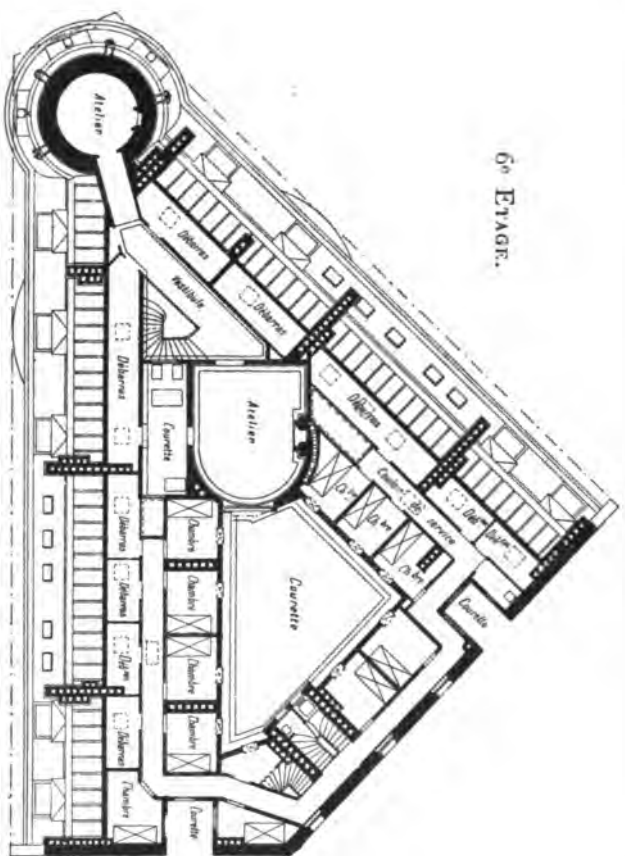
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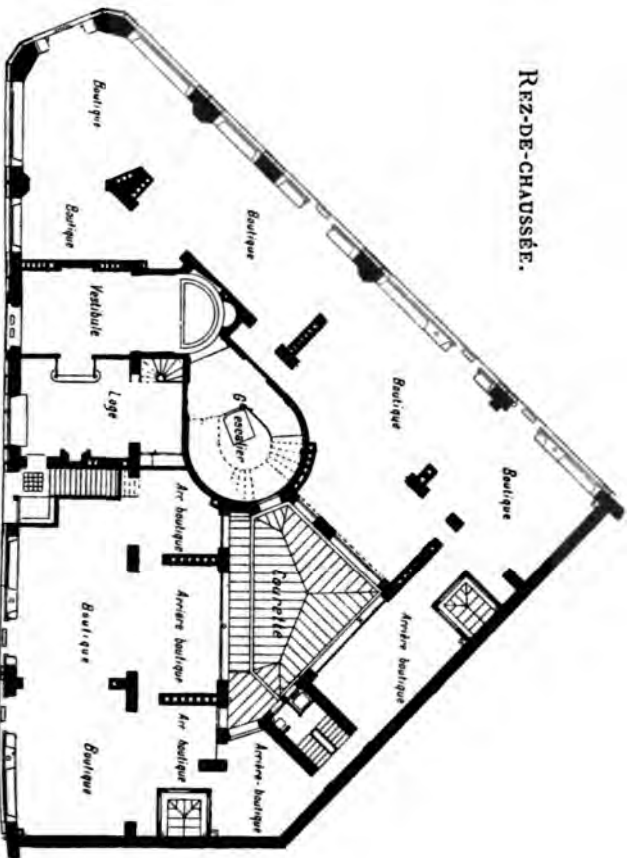




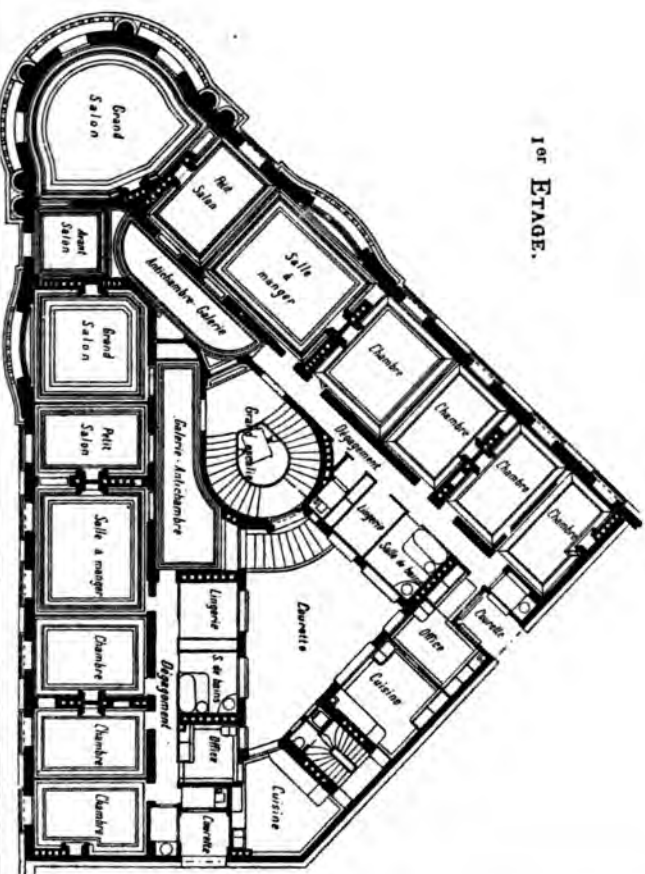
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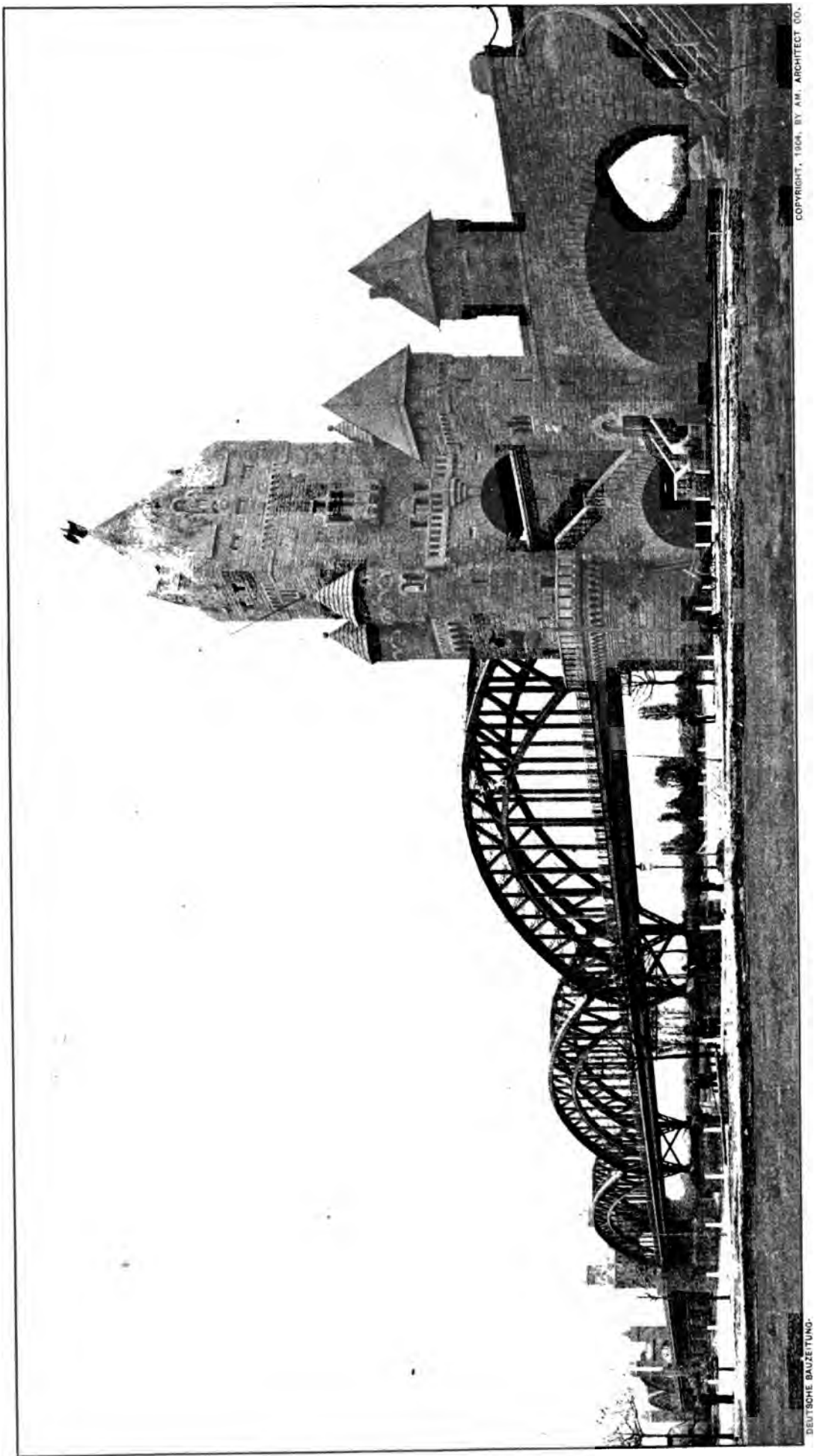
PLANS OF HOUSE ON THE AVENUE DE LA GRANDE-ARMEE, PARIS.  
M. RIVEB, ARCHITECT.

The American Architect  
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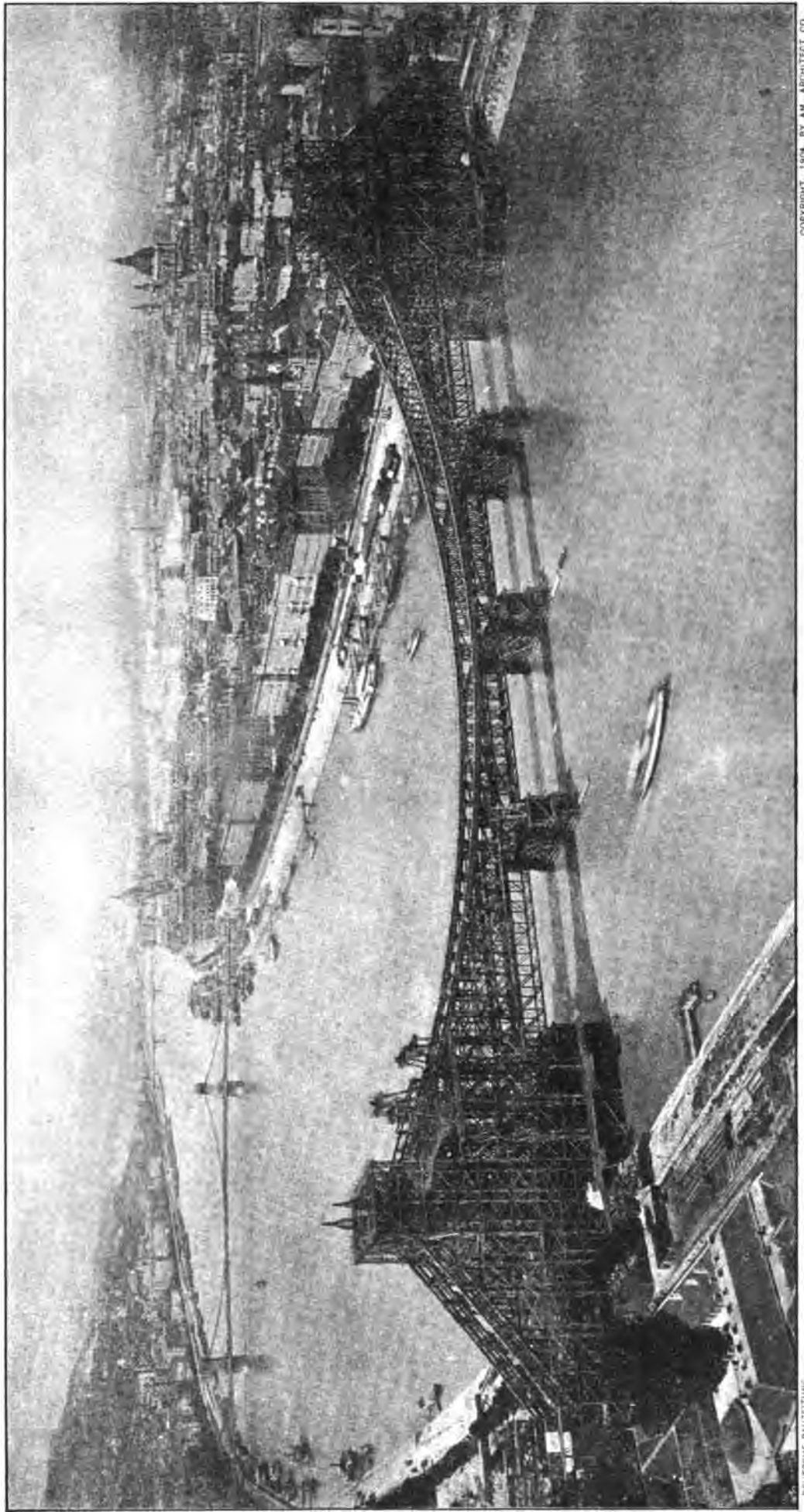






THE NEW RAILWAY BRIDGE OVER THE RHINE, AT MAINZ.  
FRANZ SCHWECHTEN, ARCHITECT, BERLIN.

*The American Architect*  
July 23, 1904.  
No. 1491.



DEUTSCHE BAUZEITUNG.

"ELIZABETH BRIDGE" ACROSS THE DANUBE AT BUDAPEST; IN COURSE OF CONSTRUCTION.

*The American Architect*  
July 23, 1904.  
No. 1491.





# THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. LXXXV

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IT is very regrettable that the amiable and seemingly admirable scheme for expressing in a graceful way the sense of obligation American architects entertain towards the French Administration of Fine Arts does not work as satisfactorily as was expected. The Prix de Reconnaissance des Architectes Americaines, that was established at the École des Beaux-Arts some dozen or fifteen years ago, is not popular, and being unpopular it operates a little to the disadvantage of the Americans who frequent the school, whereas it was the expectation that it would make them amongst the most welcome of the many foreigners who enjoy the artistic hospitality of the National School of Fine Arts. The prize, a monied one, is really of considerable value, from a Frenchman's economic point of view, and it was but natural that Americans, who like money prizes, should believe that Frenchmen would like them too. But there are things that the artistic temperament of a Frenchman holds of higher value than money: art itself for one thing and glory for another; and to a pupil at the École des Beaux-Arts both these things are summed up in the single expression, the Prix de Rome, which each pupil dreams of winning some time and so prolongs the years of his pupillage up to the very age limit. Unfortunately the winning of the American prize gains for the winner none of the coveted "*valeurs*" which are needed to secure an advance from the second to the first class, to obtain the diploma or to secure eligibility as a competitor for the Prix de Rome itself.

IT would seem that this blemish on an otherwise admirable scheme might be removed, if a proper representation were made to the Ministry of Fine Arts by the American subscribers to the fund. It was certainly their desire and expectation that the prize should be as highly cherished as any, and, at the time

of forwarding the fund, if expression had been given to the desire that the winning of the prize might count as a "first mention," if not as a "medal," we cannot but believe that the aspiration would have been heeded. The power to make the change must still lie with the Ministry of Fine Arts, and we cannot but believe the change would readily be made on proper representation from this side of the water. It is obvious that as the students must win values they, or most of them, will not waste time on a competition which will yield them none. In 1901 the American prize was not even awarded to any one, and last year nine out of the fifteen who entered were put "*hors de concours*"—that is, they did their work too carelessly or else departed from the programme through wilful indifference. Whatever the case, the result, says *La Construction Moderne*, was an "evenement plutôt rare dans les annales d'un concours sérieux."

WHILE in many ways giving the public an agreeable surprise in the sobriety with which it is controlling the situation in New York, the present Tammany administration shows a willingness in inconspicuous matters to lower the standard of performance established by Mayor Low and his associates. The immediate result of the terrible fire and explosion of chlorate of potash in the Tarrant building during Mr. Low's term of office was an investigation into the matter of storing explosives in the city, the modification of the rules governing such storage and the establishment of the Municipal Explosives Commission, each member of which was appointed because of his obvious knowledge of the subject. These members have, one by one, been displaced since the Tammany administration came into control until, a few days ago, Dr. Charles F. McKenna, a consulting chemist by profession, finding that he was the only member of the original board still in office, handed in to the Mayor his letter of resignation, declaring that his new associates had already changed for the worse, and against his protest, so many of the rules, and by so doing had so increased the hazard to which the public was exposed, that he could not consent to share the responsibility for their errors of judgment.

THE force of his action was somewhat weakened through his not knowing that Mayor McClellan had himself vetoed one of the new ordinances which he cited as amongst the most objectionable, to wit, one which allowed the storage of black powder in amounts not exceeding one hundred pounds, and its sale to any one by any storekeeper who could secure the needful permit. Still the fact that the new board attempted to establish such a rule is sufficient justification for Dr. McKenna's resignation. The ordinary explosion hazard to which the public is exposed by leaky gas-pipes, defective boilers, overcharged soda-water fountains, the experimentation of amateur chemists and the unpreventable housing in any dwelling or apartment of indefinite quantities of sporting ammunition, is great

enough, and officials who seek to increase the dangers by allowing the miscellaneous storage and sale of gunpowder are altogether too ignorant to be kept in office. The explosion hazard has been largely increased by the advent of the automobile, every one of which that operates by hydrocarbons is a potential source of danger, and an all-pervading one, since the machines are passing everywhere in the care of all kinds of persons. The danger from this source is so great that the Boston Manufacturers' Mutual Fire Insurance Company has sent a circular to its policy-holders warning them that the stabling of these machines in insured premises will cause the cancellation of the policy, and recommending the erection of special fireproof buildings for their storage, arranged so as to ventilate at the floor level, as the hydrocarbon gases are heavier than air.

IT is a misfortune that a new fireproofing ordinance that the New York Board of Aldermen is seeking to establish excites such justifiable hostility on the part of architects and builders. The public has a right to every safeguard of life, if not of property, that can be devised, and, generally speaking, it is proper to make the use of such safeguards obligatory on every one for the common good of all. But before the use of any safeguard is made obligatory three things ought to be satisfactorily established: first, that the safeguard is a real one; second, that it can be had in sufficient quantity, and third, that it can be had at a price within the means of everyone. The new ordinance seeks to compel the use of "fireproof wood" in every private building above the level of seventy-five feet, and in public buildings of all descriptions above the height of thirty-five feet, but gives no assurance that the wood the Building Department may allow to be used is actually fireproof or may remain so indefinitely. Nor is it possible to know whether the market can be supplied with fireproof wood as rapidly as building operations require. Finally, it is obvious that if the supply is less than the demand the price will advance artificially, to the greater profit of the owners of the patent rights, who are known to be good friends of the law-making powers. It seems to us that here is one of the cases where municipal ownership should be applied as a cure. If the public law is to compel everyone to use fireproof wood, the public authorities should enable the public to procure it in sufficient quantities at reasonable rates; that is, in the present case, the city should buy up the patent rights and enter on the manufacture of the needed supplies.

THERE seems to be something in the very nature of bridges that is curiously provocative of disputatiousness and the consequent creation of historic record in connection with them. The annals of Old-World cities and towns are full of the records of quarrels over the building of bridges, and the folk-tale and legend are still more prone to take a bridge as the stage on which the tale is wrought out. Just now, New York is making history very fast in the matter of her new bridges, which have come to be all the more important since experts declare that within a very few years Brooklyn Bridge will have to be essentially rebuilt. The original difference of opinion as to the merits of an eye-bar or a wire-rope suspension cable has been more or less superseded by a dispute as to the archi-

tectural treatment of the bridge and its approaches. Curiously enough the Municipal Art Commission is in a position to play a very important part in the matter, and, still more curiously, the members do not quite know how they ought to play it. The law which created the Commission declares that it must "approve" certain structures, amongst others bridges, before they can be built, but it does not specify whether it must approve—or withhold approval, by inference—on scientific, economic or artistic grounds. The Commission did approve the Lindenthal-Hornbostel eye-bar design, but only after its engineering value had been vouched for by competent experts, and it now wisely takes the ground that it ought not to be expected to express an opinion until a similar body of experts has vouched for the engineering integrity of the Best-Carrère & Hastings design. Because of this very proper attitude, Mr. Best has withdrawn his scheme from consideration for a few weeks, for the ostensible reason that he may have prepared sundry drawings and models that have been asked for, and it seems more than probable that before it again reaches the Art Commission it will have been submitted to a competent board of engineering experts, since the pressure of public feeling is turning very strongly in that direction.

ONE of those long-expected accidents happened in New York last week, when a derrick-boom broke and allowed a two-ton stone to fall from the height of six stories upon and through one of the wooden sidewalk tunnels that nowadays are provided for wayfarers as they pass in front of a new building. Fortunately, though several persons were injured by flying splinters of wood and stone, no one was killed. The Police Commissioner, in consequence of this mishap, declares that he is going to do something, as there are altogether too many building-accidents. Of course, theoretically there are too many, yet in view of our slack and hasty ways of doing things there are relatively wonderfully few accidents to complain about. And speaking of slackness, it is rather curious that the Police Commissioner should express such indignation in view of the fact that Eugene Allison, the man most largely responsible for the Hotel Darlington disaster, a man who has been indicted for manslaughter, is still at large and "wanted" by the police, who are under the control of this same official.

CORNELL UNIVERSITY, not disheartened by the set-back its School of Forestry received some time ago through the withholding of the State appropriation which was expected to come to it as a matter of course, has sought a new outlet for its energies and added a new course to the curriculum of its College of Agriculture. This is a two years' course in "outdoor art," which seems to be intended to give undergraduates a chance to discover whether it may not be worth their while, later, to take the four years' course in landscape architecture, a course which is not yet established, although it is to be. The present preparatory course, which plays to the proposed more complete course very much the part that some of the courses in Fine Arts at Harvard play to the Architectural Department, is to be under the charge of Mr. Bryant Fleming, of Buffalo, a practising landscape architect.

THE STORAGE OF EXPLOSIVES IN DENSELY INHABITED AREAS.<sup>1</sup>

THE republication of the following paper is made timely by the resignation, a week or so ago, of Dr. Charles F. McKenna, the only member possessing technical training that changes made by the present Tammany administration had left in the New York Municipal Explosives Commission as organized by Mayor Low. Dr. McKenna found that the doings or rather the undoings of his new associates—a plumber, a salesman and a furniture-dealer—were more likely to create than to extinguish dangerous conditions, and felt that in case of accident the blame would be placed on him as the only member who really knew anything about explosives. Amongst the displaced officials were a manufacturer of fireworks and a general in the United States Army.

At first sight it would appear to be better in the interest of public safety to prohibit altogether the keeping of explosives in populous places; but in every civilized community it is necessary to balance the requirements of personal safety against those of important trades. For this reason limited amounts of explosive are allowed to be kept even in the midst of cities in this country, and in most other countries of the world.

For purpose of sale there are two methods in which explosives may be legally kept in populous areas. These are technically known as modes A and B. A trader may keep in either or both of these modes, provided that he takes certain precautions, and that he registers his premises, or, in other words, that he informs the local authority of his intention to keep explosives. The officer of the local authority then has power to enter the premises and see that the legal precautions are taken and that the trader does not keep more than the law allows. Under mode A the explosive is to be kept in a building or fireproof safe detached from a dwelling-house and at a safe distance from any public place or thoroughfare. In most cases, persons who wish to keep under this mode erect a small brick building in a back yard or garden. It is obvious that explosive kept in a detached building is safer than when kept in a shop or dwelling-house, and for this reason the law allows a larger quantity in the former case. However, there is not always a back yard or garden available, and where this is the case the trader has to fall back on mode B, which consists in a substantial receptacle inside his house or shop. He can then only keep one-quarter of the amount allowed for mode A. The actual quantities which may be kept are, in the case of gunpowder, smokeless powder for small arms or fireworks, 200 pounds under mode A and 50 pounds under mode B. In the case of dynamite or other blasting explosive, or where gunpowder and fireworks are kept on the same premises, the quantities are 60 pounds under mode A and 15 pounds under mode B. Fortunately the requirements of trade seldom render it necessary to keep blasting explosives in populous places.

It will be seen that the quantities which are allowed to be kept are sufficient to do a large amount of damage in the event of explosion, and therefore the importance of taking the most stringent precautions to prevent the explosive from being ignited cannot be over-estimated. I regret to say that I have had several opportunities of witnessing the amount of damage and personal injury which may be caused by neglect of precautions in keeping explosive on registered premises. I might instance a case where from neglect of one of the most important regulations about 30 pounds of black and smokeless powder exploded in a gunmaker's shop, with the result that the stone front of the building was thrown into the street, killing and injuring several persons.

I will now deal with the precautions enjoined by law, and with others which appear to me desirable. In the first place, the receptacle in which the explosive is kept must be exclusively appropriated to such keeping, and must be kept locked so as to prevent mischievous or inexperienced persons from access to the explosive. The interior of the receptacle must be free from grit or exposed iron, and must be kept clean and free from spilt explosive. As to the best form of receptacle, there may be some difference of opinion. The ordinary japanned tin trunk is frequently used for keeping explosive under mode B, and, in my opinion, this is a very good form of receptacle, especially for fireworks. Sometimes a strong wooden box is used, while some traders prefer to fit up a cupboard or drawer for the purpose. This latter method has the disadvantage that it is not so easy to remove the

explosive in case of a fire. Gunpowder or smokeless powder may be kept in a fireproof safe, but the law no longer gives any advantage in respect of quantity to the trader who uses this form of receptacle, with the exception of those who register their premises for the keeping of gunpowder only, and who may still keep 100 pounds in a fireproof safe under mode B. This privilege has been taken away by an alteration of the law in regard to premises registered for explosives other than gunpowder, the reason being that the advantage of a fireproof safe for the keeping of explosives is regarded as more doubtful than it was when the Explosive Act was passed. At that time experiments were made by subjecting safes containing small quantities of gunpowder to the heat of an actual conflagration. The results were satisfactory in the highest degree, and there is no doubt that a well-constructed fireproof safe, under normal conditions, does offer good protection to its contents against destruction by fire. Nevertheless, on two occasions well-made fireproof safes have failed to prevent an explosion. The first of these accidents occurred during a fire at a gunmaker's shop, and there is little doubt that the failure of the safe was due to its having fallen from the top of the building and being broken by the fall. The cause of the second accident was, however, much more doubtful. In this instance a fireproof safe by one of the best makers, which was locked and bolted, and which contained nothing but gunpowder, exploded, killing the only man in the vicinity. There was evidence that the rule as to cleanliness of the interior had been neglected, and that gunpowder had been spilt, not only in the safe, but also on the stone floor outside. The only theory which I could form as to the cause of this accident was that the powder spilt on the floor had been ignited, probably by the fall of a steel implement, and that the flash had been communicated to the interior of the safe by means of powder grains crushed in the flange of the door. When an explosion does occur in a safe its effects are liable to be more disastrous than if the explosive is contained in a less substantial receptacle. Another disadvantage of the use of a safe for explosive is that, owing to its great weight, it cannot readily be removed in case of fire. This brings me to the consideration of the best position within a building for the keeping of explosive. The only regulation on the subject is to the effect that the explosive may not be kept in dangerous proximity to articles liable to cause fire or of a highly inflammable nature. Among traders there is considerable difference of opinion as to the safest position in which to keep their explosive. Some prefer to place it at the extreme top of the house, and there is a good deal to be said for this practice. At the top of a building an explosion would generally be less disastrous to life and property than one on the ground floor. Again, when placed in a top room the explosive will be less accessible to unauthorized persons, and will be freer from certain dangers of ignition to which it might be exposed in a part of the building which is much frequented. On the other hand, explosive at the top of a building is more difficult to remove and more likely to be involved in the case of a fire in the building. Again, the keeping of the explosive in an attic often involves the use of a naked light if the receptacle has to be opened after dark, and this may involve a danger which would be absent if the receptacle is kept in a well-lighted shop. On the whole, I consider that the balance of safety is in favor of a light receptacle placed on the ground floor within easy reach of a door, through which it can be removed from the building. It will be seen from what I have said that I regard it of high importance to be able to remove explosive altogether from a building in case of fire, and for this reason I consider it desirable that the chief officer of the Fire Brigade in every town should keep himself informed, not only as to the premises which are registered for explosive, but also as to the position of the receptacle in each case.

Coming now to the causes which lead to the ignition of explosive, I need hardly say that the most frequent cause, and the one against which the most careful precautions must be taken, is the direct application of a spark or flame. The striking of a match in order to examine the contents of the receptacle can only be characterized as an act of reckless folly; but this has been the cause of more than one accident quite recently. A gas flame near the receptacle is not necessarily a source of danger; but if proper care is not taken to keep the receptacle shut and to avoid the spilling of explosive, an ignition may be caused by the careless throwing down of a smouldering match at the time when the gas is being lighted. An ignition from a spark caused by the impact of iron surfaces, or of iron and stone, is of more rare occurrence, but this also must be guarded against. It is advisable

<sup>1</sup> A paper, by Captain Thompson, H. M. Chief Inspector of Explosives, London, read at the International Fire Prevention Congress of 1903.



to cover the floor immediately round the receptacle with linoleum or other soft material, which will not only facilitate the sweeping up of any spilt explosive, but will also prevent the possible striking of a spark between a nail in the floor and one in the boot of a person approaching the receptacle.

The spontaneous ignition of an explosive has seldom been the cause of an accident in recent years in this country. It is true that nearly all nitro-compounds, of which smokeless powders are mainly composed, if improperly manufactured, are liable to decomposition, which may lead to spontaneous ignition; but this fact is now so fully recognized by manufacturers that it is rarely that we meet with explosives showing any tendency to such decomposition. Nevertheless, it is not advisable to keep old samples of such explosives, or samples the origin of which is at all doubtful. The tendency to spontaneous ignition is greater in the case of some fireworks containing colored fires, especially when these have been exposed to moisture. At one time there was considerable difficulty on this score, and several fires occurred which were attributable to the spontaneous ignition of colored fireworks. An order was therefore made prohibiting the manufacture of fireworks containing the admixture of chlorate of potash and sulphur, this mixture having been found to be particularly unstable. Since then there has been almost complete immunity from accidents of this description.

The law of this country prohibits the keeping in one receptacle of explosives which may be dangerous to one another. Thus ammunition which carries its own means of ignition, such as sporting cartridges, is not allowed to be kept with gunpowder; and fireworks, owing to their miscellaneous character, are always to be kept in a receptacle by themselves. There is no danger, however, in keeping any of the varieties of smokeless powders and blasting explosives authorized in this country in the same receptacle, and this is allowed by law.

Some of the worst accidents with explosives which have occurred in towns have originated in the filling of sporting cartridges in gunmakers' shops, but in every case some gross breach of the regulations has led to the disaster. Almost every operation of manufacture carried on with explosives is attended with some degree of danger, and though the operation of filling cartridges is not regarded as one of the most dangerous, it is nevertheless one in which ignitions sometimes occur. Consequently strict precautions should always be taken in the room where the operation is carried out. The most important of these is the limitation in the quantity of explosive present. The law fixes the limit at five pounds of gunpowder or smokeless powder. It also requires that no other work shall be carried on at the same time, and that no fire or artificial light of an unsafe kind shall be in the room. In addition to the requirements of the law, it is advisable to limit the number of persons present to two, and also to be careful as to the sweeping up of spilt powder. To facilitate this it is well to have both the filling bench and the floor covered with linoleum.

A further precaution enjoined by law is that no package containing more than one pound of black or smokeless powder may be opened on registered premises. The object of this regulation is to prevent any large amount of powder from being exposed in a shop, and also to minimize the chance of the explosive being spilt. The rule is relaxed as regards the room where cartridges are filled, where, as a matter of convenience, packages containing five pounds of powder may be opened.

In addition to the regulations as to the keeping of explosive, the law of this country restricts the manner of sale; and some of the rules under this heading have a more or less direct bearing on fire prevention. For instance, explosive may not be hawked or sold in a public thoroughfare. Not long ago a rather serious conflagration ensued from a breach of this regulation coupled with criminal recklessness. An enterprising traveler called at a shop with a box of fireworks for sale. In order to show their quality he let one off in the shop. The whole contents of the box became ignited, with the result that the shop was set on fire. Again, explosive may not be sold to children under the age of thirteen, a precaution that needs no comment.

I have dealt only with the keeping of comparatively small quantities of explosives, because where it is desired to keep larger quantities it is necessary to find a place where certain specified distances can be maintained from inhabited houses. Such a place can hardly be described as being in a densely inhabited area, and therefore the consideration of the distances which should be maintained does not lie within the scope of this paper.

#### PETROLEUM.

We now come to the consideration of the storage of petroleum, and here we have to deal with a somewhat different class of danger, which must be met by different precautions. From the point of view of fire prevention, I regard petroleum as more dangerous in some respects than explosives. In the first place, it is in more general use and more extensively stored in populous places. If an explosion of gunpowder occurs much local damage may be caused, but usually the whole of the powder will have been consumed, and the resulting fire may not be difficult to deal with. It is otherwise with petroleum. If an explosion of petroleum vapor takes place the damage done may be quite as great as that due to the gunpowder explosion, while the after consequences may be much more serious. The vapor explosion will almost certainly be followed by a fierce conflagration of the petroleum itself, and if any considerable quantity is present the conflagration may be such as to defy the efforts of the most skillful fire brigade. Water is of little use in extinguishing a petroleum fire, as the liquid will float and continue to burn on its surface. Moreover, the burning petroleum will sometimes flow from its original position, spreading the fire as it goes. Cases have occurred where the burning liquid has flowed on to the surface of the water in a harbor and caused serious damage to the shipping. I have no wish to exaggerate the dangers in storing petroleum, but only to indicate the very serious consequences which may ensue from the neglect of ordinary precautions, which, unfortunately, sometimes prevails amongst those who trade in this commodity.

Before dealing with these precautions it may be well to say a few words about the properties of petroleum, in order to dispel certain misconceptions which appear to be rather widely entertained. Strange as it may seem, it is by no means uncommon to meet with well-educated persons who believe that petroleum is in itself an explosive, while others believe it to be capable of spontaneous ignition. These persons generally hold the belief that when the liquid is raised in temperature to a degree known as its "flash point" it explodes, bursts into flame, or else undergoes some marked physical change. These beliefs are, of course, absolutely unfounded.

It would be out of place here to undertake an elaborate discussion of the chemistry of petroleum; suffice it to say that the main constituents are carbon and hydrogen, and that these are bound together in molecular groups according to certain definite chemical laws. These groups contain different numbers of atoms according to the particular variety of petroleum. In general it may be said that the simpler the group and the fewer the number of atoms of which it is composed, the lighter and more volatile will be the petroleum. The simplest groups are gaseous at ordinary temperatures, whilst the most complex are generally solid. Thus what is known as the paraffin series commences with marsh gas, and, passing through the various grades of spirit, illuminating, and lubricating oils, ends in the solid known as paraffin wax. In practice it is seldom that a truly homogeneous variety is met with. All the descriptions of petroleum in commercial use are composed of more than one molecular group. Consequently their degree of volatility is not perfectly definite, and a purely arbitrary test has had to be devised to determine this quality. It is upon the volatility that the danger in the storage and use of petroleum greatly depends.

I have said that the liquid is in explosive in itself, but the vapor when mixed with air in certain proportions is capable of exploding with great violence when ignited. Fortunately the proportions necessary to form an explosive mixture are very limited. The mixture begins to be inflammable when there is about 1.8 per cent of vapor. An increase to 2 per cent renders the mixture explosive, while when the proportion exceeds 4 per cent the liability to explosion begins to disappear, but the mixture continues to be highly inflammable.

I have said that an arbitrary test has been devised to determine the degree of volatility of any particular variety of petroleum. The test adopted in this country as giving reliable and uniform results is known as the Abel flash test. This test determines the temperature at which the sample produces a definite amount of vapor under the special conditions of the apparatus. It must not be supposed, however, that below this temperature the oil gives off no vapor at all, or that under other conditions it gives off dangerous amounts of vapor immediately above the temperature of its flash-point.

The flash test was devised primarily with a view to affording a means of distinguishing between petroleum oil and petroleum

spirit (gasolene) for legislative purposes; or in other words, in order to be able to draw a line between the varieties of petroleum which are in common use for illuminating purposes, and those which are so volatile as to require special restrictions in storage. For reasons which it is not necessary to enter into, the line has been drawn in this country at a flash point of 73 degrees Fahr. by the Abel test. Oil above this flash point is not subject to any legislative restriction, while petroleum spirit, which is below, may not be kept, except in very small quantities, without a license. An exception has recently been made in the case of spirit kept for use in motor cars, for the keeping of which general regulations have been made.

Petroleum should be kept in metal vessels wherever possible. I regard this as imperative in the case of spirit, having recently had experience of the danger of leakage of vapor through wooden barrels. Such barrels are still strongly advocated by some persons, both for the conveyance and storage of petroleum, but in the case of spirit I find their arguments entirely unconvincing. One of the principal virtues of a wooden barrel when used for an aqueous liquid is that the liquid swells the wood, and by increasing the pressure between the staves diminishes the chance of leakage. This quality is entirely lost with petroleum, which, though it permeates the wood, has no effect in swelling the staves. Consequently to keep the petroleum from all leaking out, it is necessary to coat the interior of the barrel with glue. When this coating is fresh, the barrel may be fairly free from leakage; but when owing to dry weather the staves have shrunk, or when the barrel has been knocked about, the glue coating becomes defective, and more or less leakage inevitably occurs.

Metal vessels are invariably employed for the petroleum spirit used in motor cars. This is partly due to the fact that the above-mentioned regulations require that this spirit should only be kept in such vessels of a capacity not exceeding two gallons, and partly to the refusal of the railway companies to carry it otherwise than in metal vessels. The licenses of most local authorities contain a similar provision. It is possible that at some future date the use of wooden barrels for petroleum spirit may be prohibited altogether.

As to the place where the petroleum should be stored, it is very desirable that this should be outside the fire-risk of a dwelling-house, that is to say, in some building wholly detached or separated by a fireproof wall. Probably the safest method is in an underground tank separated from all buildings. Where, however, it is necessary to store petroleum inside a shop or dwelling-house, the best position is a well-ventilated cellar, from which the oil may be drawn by means of a pump in the case of retail dealers. The worst place of all is under the main staircase.

The metal tank in which the oil is stored should be hermetically closed, with the exception of an air hole, which should be covered with very fine copper wire gauze. In the case of fire the oil in such a tank may all burn away without seriously adding to the conflagration, or may even escape ignition altogether. Of course, water must not be played into the tank, as this would have the effect of floating out the petroleum. In every place where petroleum is stored, there should be a supply of sand and a shovel. This is useful, not only for absorbing any spilt petroleum, but also for extinguishing fire in its initial stage.

The quantity of oil which may be kept in any place is unlimited, but in the case of spirit (gasolene) it is governed by the conditions of the license, and varies according to circumstances. Users of motor-cars are allowed to keep 60 gallons, which must be contained in two-gallon metal vessels.

The most important precaution is the exclusion of naked lights from the neighborhood of the petroleum. If only oil is present, it is sufficient to guard against a light being taken into the immediate vicinity of the vessel in which the petroleum is kept, but in the case of spirit, an ignition may take place at some distance from the actual vessel if there has been any leakage, as the vapor is heavier than air and has a tendency to flow or drift with light currents of air to a considerable distance before it is so far diluted as to become unflammable. For this reason a naked light should not be taken into any store or room where spirit is kept or used, and care should be taken that there is no fire or light in the vicinity of such store or room. In general, the store should only be entered during daylight, but if it is necessary to enter at night a safety-lamp such as is used in coal mines should be employed. Some persons think that a lantern is sufficient protection to a light, but this is not the case unless every communication between the flame and the outside air is closed by very fine metal gauze as in the safety-lamp.

An electric spark is quite as dangerous in producing vapor

ignition as an open flame. Several fires have been caused by the ignition of petroleum vapor by means of the tiny spark given off by a textile fabric which has become electrified. If electric light is installed in any building in which petroleum spirit is stored or used, this should only be done under the advice of an expert thoroughly acquainted with the special risks to be guarded against. Time will not permit of my doing more than touching on the general principle which should underlie such installation. The lamps themselves should be enclosed in strong glass outer globes fitted on with an airtight joint. The wires should be well insulated and should preferably be contained in metal pipes connected to earth. All switches and fuses should be outside the building beyond the reach of vapor unless they are of such special construction or are so enclosed in metal cases that the vapor cannot possibly reach the interior. In general no current-bearing part, that is, no metal part in connection with the source of supply, should be exposed.

As in the case of explosives, no highly inflammable material should be kept near the petroleum. In this connection it may be well to mention the danger which may arise from empty petroleum barrels. It is commonly supposed that the fire risk is at an end as soon as the barrel is empty, and such barrels are deposited anywhere regardless of possible ignition. The wood being saturated with petroleum these barrels are often highly inflammable, and when they have contained spirit are generally full of vapor. Several accidents have occurred through mischievous boys putting lighted matches to the bung-holes of empty spirit barrels.

A necessary precaution is to guard against petroleum, especially spirit, finding access to the sewers. Not long ago I was called upon to investigate a curious explosion, fortunately not followed by a fire, which occurred in a dwelling-house in the North. The cause was traced to the washing out of partially emptied spirit cans into the sewers at a distance of about 200 yards farther up the street. The vapor from the sewer had found its way into the house through defective drains. Special care should be taken where any large quantity of petroleum is kept, that there shall be no outflow of the liquid in case of fire. Where the tank is not underground, it should be surrounded by a trench or dwarf wall, or should be placed over a cavity capable of containing the whole of the liquid should the tank be damaged by fire.

#### CARBIDE OF CALCIUM.

We now come to the consideration of the precautions to be taken with a chemical product, the importance of which is growing very rapidly, namely, carbide of calcium. This material is manufactured in the electric furnace by the action of coke or other form of carbon on lime at a very high temperature. Its principle use is in the production of acetylene, which is a gas having a very high illuminating power. Owing to the very simple method by which this gas is produced, and to the great brilliance and whiteness of the light which it gives, it is specially adapted to certain kinds of illumination. The demand for carbide is therefore already considerable, and as the popularity of the light increases, the storage of this chemical will become more and more important. In this country the material has been subjected to restriction by bringing it within the scope of the Petroleum Acts, so that it is made illegal to store quantities greater than five pounds without a license.

Carbide of calcium is of itself absolutely inexplorable and unflammable, and its sole danger lies in the readiness with which it gives off a highly inflammable gas from the mere contact of water or moist air. As long as the carbide is stored in hermetically closed vessels therefore, it is quite harmless. Even if these vessels are exposed to fire in a burning building, no danger arises provided that the water is not played on the contents.

Acetylene, like all the other inflammable gases, tends to form an explosive mixture with air, but it differs from other gases in the very wide range of proportions in which it is capable of forming such a mixture. Thus, when the proportion of acetylene in the air reaches three per cent, the mixture commences to be explosive, and continues to be so under certain conditions until the proportion is over 80 per cent. The maximum explosive force is reached when the proportion of gas to air is half and half. The reason for this wide range is to be found in the fact that the gas possesses explosive properties in itself without any admixture of air. When raised to a pressure of two atmospheres or even less, acetylene alone will explode with very great violence on the application of a flame or spark. For this reason the compression of this gas is not allowed in this country except under very special conditions.

From what I have said of the properties of carbide of calcium,

it would appear that only one precaution is necessary for its safe keeping, namely, that it should be contained in a hermetically sealed metal vessel. This is indeed the principal precaution necessary, but inasmuch as it is difficult to ensure that vessels shall be at all times absolutely impervious to moisture, and as these vessels have generally to be opened at times for the removal of their contents, it is desirable also to add certain other precautions. The vessels in which the carbide is contained should be kept in some dry, well-ventilated place and should be protected from the weather. No large amount of the material should be stored in any shop or dwelling-house, or in any highly inflammable building; and when a fire does break out in or near a carbide store, no attempt should be made to extinguish it with water if there is any likelihood of the carbide being wetted.

Excepting in the case of storage inside houses or shops, the quantity to be allowed in any one place is of little importance, because when more than a very limited quantity is kept, the danger is measured more by the amount of water which can find access to the material than by the amount of carbide present. In order to generate the full amount of gas from any quantity of carbide, it is necessary to add at least an equal weight of water. The precaution in regard to naked lights, which is all-important in the case of stores for petroleum spirit, is not so necessary in places where carbide is kept, because if the precautions which I have just mentioned are observed there will not be much chance of the formation of gas, and what little is formed will be readily carried away in a well-ventilated building. Unlike petroleum vapor, acetylene is of approximately the same specific gravity as air, and mixes easily with the atmosphere. A naked light should not, however, be taken near one of the carbide vessels when it is opened, as gas is sure to have accumulated inside, and it is wise to exclude them from the building altogether. In the case of the building in which an acetylene generator is installed, the precaution as to naked lights should certainly be observed, and on no account should the generator be examined with a lamp capable of igniting a gaseous atmosphere. Several serious accidents have occurred from the neglect of this very obvious precaution. In places where acetylene is used, more danger may arise in connection with the generation of the gas than in the storage of the carbide. It would be beyond the scope of this paper to deal with the conditions of safety in the design and construction of acetylene generators, and I will therefore refer those interested in this matter to the report on the subject by a committee of eminent experts, which was published as an official document last year. One precaution in connection with the generation of acetylene I may mention, and that is to avoid discharging the sludge or spent carbide from the generator direct into a sewer. Unless this sludge has been immersed for some time in a large volume of water it may continue to give off gas in sufficient quantity to give rise to danger in a sewer or other confined space.

#### OTHER CHEMICALS.

It would be impossible within the limits of this paper to deal with all the numerous chemicals which under certain conditions are capable, directly or indirectly, of causing fire or explosion. Strong acids when they come in contact with certain other substances may develop sufficient heat to cause a fire, and it is conceivable that caustic alkalis may do the same. Quicklime, owing to the heat evolved in combining with moisture, has, I believe, often been the cause of fires, and the metals sodium and potassium give rise to still greater danger on the same account. It is well known that these metals burst into flame and even cause explosion on coming in contact with water or any substance containing moisture; but it was at one time doubtful whether exposure to moist air was sufficient to cause ignition. This doubt was set at rest by Dr. Dupre, Chemical Adviser to the Home Office, who carried out experiments at my instigation. He found that although the rate of oxidization of sodium in moist air was too slow to raise the metal to the temperature of ignition, yet the soda formed is so hygroscopic that drops of moisture accumulate on the surface; and if one of these drops runs down on to a portion of the metal less oxidized, an ignition takes place. I believe this to have been the cause of a serious explosion which occurred in a small building in the exhibition grounds at Earl's Court a few years ago, where both sodium and gunpowder were stored.

Another substance which gives rise to considerable fire risk on account of its affinity for water, is sodium peroxide. This chemical is used as a producer of oxygen, which it readily gives off when acted upon by water. When pure, its behavior is somewhat remarkable. Dr. Dupre has shown that a piece of sodium peroxide if rubbed against the surface of a piece of wood will

set it on fire, and if the peroxide in a powdered condition is sprinkled on wood shavings, a drop or two of water is sufficient to make the whole burst into flames.

The dangers with those chemicals which I have described suggest their own remedies. Strong acids and alkalis should be kept out of reach of other chemicals, and care must be taken to confine them in their own containing vessels. Chemicals having a strong affinity for water should be stored in hermetically sealed receptacles, preferably of metal. Sodium peroxide must be kept away from wood or other carbonaceous material. The metals, sodium and potassium, if required for immediate use, may be kept in heavy mineral oil, but care should be taken that they are entirely covered by the liquid.

We now come to the class of chemicals, which, like petroleum, give off inflammable vapor. Foremost among these is bisulphide of carbon, which is used to some extent in the arts as a solvent. Not only is this extremely volatile, but it presents the additional danger that its vapor ignites at a comparatively low temperature. According to one authority, the igniting point of carbon bisulphide vapor is as low as 149 degrees C., so that it might be ignited by a high-pressure steam-pipe. This liquid has a high specific gravity, which enables it to be kept under water, in which it is insoluble. Several other liquids used as solvents give off inflammable vapor freely, as for instance, ethers, alcohols, acetone, amyl acetate, turpentine, etc. For all these the precautions in storage should be much the same as for petroleum spirit.

The fire risk of phosphorous in the crystalline form is well known. This substance should invariably be kept under water. Phosphide of calcium, on coming in contact with water, gives off a gas—phosphoretted hydrogen—which ignites spontaneously in air. This property is taken advantage of in certain marine lights, which are arranged to take fire by the mere act of throwing them into the water. This chemical must, of course, be stored in hermetically sealed vessels, but, owing to its very dangerous nature, it should not be kept at all in any shop or dwelling-house.

Some of the coal-tar products used in the dyeing trade possess explosive properties, but these are mostly of a feeble order, and the materials themselves are not, as a rule, highly inflammable. Picric acid, however, is capable, under certain conditions, of exploding with great violence, and is now practically treated as an explosive in this country, where it is subjected to many of the restrictions which apply to other explosives. This acid is now little used as a dye, but there has been a considerable demand for it as a military explosive. It was long doubted whether picric acid alone was capable of explosion, in the absence of a detonator or of some metallic picrate. Experience has, however, convinced me that when any considerable quantity is involved in fire, a violent explosion may result, even when no metallic substance capable of forming a picrate is present. Some of the metallic picrates are violently explosive, especially picrate of lead. In contact with iron, picric acid forms a picrate which is very sensitive to friction, and has been the cause of more than one ignition of picric acid in manufacture.

The next chemical to be considered is chlorate of potash, which owes its uses to the fact that it is an efficient oxygen producer. It does not give up its oxygen except under the influence of heat or chemical reaction, and is therefore stable at normal temperature, and free from liability to spontaneous ignition. Its danger lies in the readiness with which it forms explosive mixtures with carbonaceous material, especially under the action of fire. Thus if, during a conflagration, melted chlorate became mixed with some powdered or melted organic matter, a serious explosion might ensue. In very large quantities it is capable of exploding by itself in the course of a conflagration, as was shown by a serious explosion at St. Helen's a few years ago. It also has the property of rendering any woodwork or fabric with which it has come in contact very highly inflammable, and where it is involved in a fire it will intensify the conflagration by supplying oxygen to the flames. Chlorate of potash and other chlorates should, therefore, be kept away from strong acids, and from any carbonaceous material with which it could possibly mix, and should not be stored in inflammable buildings. Saltpetre and other nitrates are also oxygen bearers, but are not possessed of explosive properties, nor do they readily form explosive mixtures. They are, however, capable of intensifying a conflagration, and of rendering woodwork more inflammable from a spark, though in a less degree than chlorate of potash. It is better, therefore, that nitrates should be stored in an unflammable building.

I have dealt with the above chemicals somewhat briefly, partly in order to keep this paper within reasonable limits, and partly

because few of them are likely to be extensively stored in densely inhabited areas. It must be remembered, however, that in the case of those which are liable to cause ignition, a disastrous fire might be initiated by even a very small quantity of the chemical.

#### ARLINGTON CEMETERY.

IN respect to number of burials, Arlington is pretty nearly the largest of the eighty-three national cemeteries, but its romantic history makes it by far the most interesting of them all. It was formerly the property of Gen. Robert E. Lee, and he was living there when Fort Sumter was fired upon. He was married in 1831 in the drawing-room of the old mansion, where visitors nowadays are requested to register their names, and in the room across the hall he wrote (April 20, 1861) his resignation as an officer of the United States army. Two days later he himself carried the resignation across the river to Washington, and handed it to Gen. Winfield Scott. He left Arlington on the same afternoon, never to return, and the next day accepted the command of the Confederate forces.

About 17,000 men have been buried at Arlington since it was opened as a national cemetery, in 1864. Soon after the battle of Bull Run the Government took possession of the mansion for a hospital, and used it for this purpose through the Civil War. The first person buried there was a Confederate soldier named Reinhardt, of the Twenty-third North Carolina Infantry, who died in the hospital May 13, 1864. During the next two months 2,619 Federals were interred there, and nearly every battle-field between the Potomac and the Rappahannock contributed its quota to the Arlington necropolis.

The appearance of the old buildings, especially the Lee mansion, has been preserved as far as possible. Six stone columns which beautify two of the gateways on the east front were part of the north portico of the old War Department, and were removed on the demolition of the latter structure in 1869. The stone pillars and entablature of the Temple of Fame—a noteworthy feature of the cemetery—are from the corridors of the Patent Office in Washington, taken away after its partial destruction by fire in 1817.

Within the inclosure of the grounds is Fort McPherson, one of a chain of forts built during the Civil War for the defense of the capital. It has been restored as far as practicable.

One of the most striking features of the cemetery is the "tomb of the unknown dead," a massive block of granite, on which are inscribed the words: "Beneath this stone repose the bones of 2,111 unknown soldiers, gathered after the war from the fields of Bull Run, and the route to the Rappahannock. Their remains could not be identified, but their names and deaths are recorded in the archives of their country, and its grateful citizens honor them as of their noble army of martyrs. May they rest in peace."

The Arlington Cemetery is part of an original grant of one thousand acres made by William Bulkley, Governor of Virginia, to Robert Howsen, in October, 1664, in payment for the transportation of settlers from England to the colony. Howsen, in the same year, sold the property to a person named Alexander for six hogsheads of tobacco, and more than a century later a descendant of this purchaser transferred it to John Parke Custis, the equivalent being £1,100 in Virginia currency. Custis was the son of Martha Washington by her first marriage. He was aide-de-camp to Washington, and died of "camp fever" (typhoid) at Yorktown, his two youngest children, G. W. Parke Custis and Nellie Custis, being subsequently adopted by Washington.

G. W. Parke Custis inherited the estate, built the still existing mansion in 1814, and died in it three years later, leaving the property to his only child, a girl, who married Gen. Robert E. Lee. By an executive order, dated January 6, 1864, Arlington was ordered sold for taxes, and was afterwards bid in by the Government for \$26,800. Mrs. Lee, who died in 1873, never claimed it, but her son, G. W. Custis Lee, brought suit in the courts to have the sale set aside. The case went up to the Supreme Court, which decided that the heir had equity on his side, and Congress paid him \$150,000 for the property.

Thus it appears that the estate was not confiscated by the Government, as is commonly supposed. In the southwest corner of the cemetery, where several hundred Confederate soldiers lie buried, two simple tablets mark the graves of George Washington Parke Custis and Mary Lee Custis, his wife. They were erected by Mrs. Robert E. Lee, and bear the inscription: "Blessed are the merciful, for they shall obtain mercy."

The Temple of Fame above referred to is a structure of dignified simplicity and no great size, its dome-like roof upheld by pillars on which are inscribed the names of Washington, Lincoln,

Grant, Meade, Thomas, Farragut, Reynolds, Garfield, and Humphreys. Another notable feature of the Arlington Cemetery is the amphitheatre—a beautiful enclosure surrounded by green walls of foliage, with a pillared platform on one side for the delivery of orations on Memorial Day and on other ceremonial occasions.

Most of the national cemeteries were located, appropriately enough, on battle-fields, those of Chattanooga, Stone River, and Gettysburg being first selected. In Virginia, where so much hard fighting was done during the Civil War, there are no fewer than seventeen such burying-grounds for soldiers. There are in all about 340,000 men interred in the eighty-three Government reservations of the kind, and in each case Uncle Sam furnishes a headstone and foot-stone of granite or white marble, unless surviving relatives are disposed to put up something more elaborate in the way of a monument.

Ours is said to be the only country that bestows such honors of dignified and permanent interment, in the midst of beautiful surroundings, upon its common soldiers. In lieu of an inscription, each headstone bears a number, which refers to a name in a book. Of course, in numerous instances the remains are registered as "unknown," but the system adopted by the Federal authorities during the Rebellion was so perfect, and interments were so conscientiously made on the fields where the Union arms won, that over 90 per cent of the dead were afterwards identified.—*Washington Correspondence Boston Herald.*

## ILLUSTRATIONS

[Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.]

HOUSE OF ALBERT STONE, ESQ., BAY STATE ROAD AND SHERBORN STREET, BOSTON, MASS. MESSRS. FEHMER & PAGE, ARCHITECTS, BOSTON, MASS.

HOUSE ON THE AVENUE DE LA GRANDE-ARMEE, PARIS, FRANCE.  
THIS plate is copied from *La Construction Moderne*.

#### PLANS OF THE SAME.

NEW RAILROAD BRIDGE OVER THE RHINE NEAR MAYENCE.

THIS and the following plate are copied from *Deutsche Bauzeitung*.

NEW STREET BRIDGE OVER THE DANUBE, BUDA-PESTH, HUNGARY.

#### Additional Illustrations in the International Edition.

DOOR TO HOUSE OF ALBERT STONE, ESQ., 152 BAY STATE ROAD, BOSTON, MASS. MESSRS. FEHMER & PAGE, ARCHITECTS, BOSTON, MASS.

A MODERNIZED PORCH ON ESSEX STREET, SALEM, MASS.

THE SALLE DE MARIAGE: HOTEL DE VILLE, BRUSSELS, BELGIUM.

THE REREDOS IN THE CATHEDRAL, TRURO, ENGLAND.

## COMMUNICATIONS

[The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.]

#### A CASE OF MERE PLAGIARISM.

TO THE EDITORS OF THE AMERICAN ARCHITECT:

Dear Sirs,—Possibly you may have information conveniently at hand that would be valuable to us in regard to a legal question. The situation is as follows:

Recently a neighboring city invited several architects to enter a competition for an important high school building. Subsequently, drawings were submitted at a specified time, and our presentation consisted of a set of specially prepared preliminary studies, also the plans of a building we had under construction and about completed, which we might designate as exhibit "B,"



and were favorably commented upon by the School Commissioners. The award was made to one of the competing architects, a gentleman who was in our employment for quite a number of years, and was in our office at the time of the preparation of exhibit "B," which was submitted as above stated in connection with those specially prepared for the competition. Now we find that the plans (not including elevations) prepared and being executed by the successful architect, with the exception of the rooms being reduced two or three feet in size and a few of the minor and less important partitions changed, are a *fac simile* with our exhibit "B." The similarity of the plans is quite evident when describing the general lay-out of the building. Besides a certain number of important rooms occupying the first floor, entrances are at each end of the building, two stairways to the second floor, located on the rear, with a room between, and very wide corridor on the first floor and very large assembly-room on the second floor, lapped over and occupying a certain portion of the space occupied and used as corridor on the first floor. We simply repeat this comparison so that in saying one plan is a *fac simile* of the other, from the result that exhibit "B" is somewhat out of the ordinary run of school buildings, so that by comparison of the two plans similarity is apparent. The elevations are entirely different.

The knowledge we desire, which possibly you may have some information bearing upon, is, if through the courts, if not otherwise, would there be any recourse for this appropriation of ideas conceived in this office? Trusting we may hear from you at your earliest convenience, we remain, yours truly, X. & Y.

[If we understand the situation which this communication details, our correspondents certainly have not material enough out of which to make a case. The situation possibly has its awkward faces and our correspondents feel they have been wronged, though they do not clearly know how, and neither do we. Everyone but the most anxiously self-sacrificing theorist would probably hold that the successful competitor in drawing on his memory had a right to use whatever he found stored there—in this case the recollection that a certain arrangement of rooms had once seemed to him so good that it would be worth while to adopt the arrangement in some future similar case. The information was his to use, since the design was not copyrighted, quite as much as any other piece of technical training he may have picked up in his career as a draughtsman. A bookkeeper who takes with him to a new employer an improved method of bookkeeping devised by a former employer does no wrong, nor does the mechanic who uses in a new position the skill and information he acquired in his earlier places. These seeming acts of injustice are but part and parcel of the everlasting chain of progress, links which save us all from having to begin again at the very bottom of the well we wish to emerge from. If the successful competitor had actually carried off blue-print or tracing of the plan in question, perhaps a charge of petty larceny could be maintained; but what he carried in his memory, most men would hold was his to use.—EDS. AMERICAN ARCHITECT.]



**FEEDING A DYING TREE.**—I once saw a very old tree rejuvenated in a remarkable manner. It was a very ancient walnut that had for years shown signs of decay. But the keeper in front of whose house the tree stood took to slinging the carcass of each deer he killed on one of its boughs for dressing. During the process all the blood dripped on the ground and was absorbed. The following spring this tree put forth an astonishing crop of leaves, and in less than three seasons it was making new wood and showing all the vigor which had characterized it thirty years before.—*Country Gentleman.*

**A NEW HOSPITAL FOR VIENNA.**—The Austrian Emperor, Francis Joseph, has just laid in Vienna the foundation stone of a new hospital, which is likely to be one of the most perfect institutions of its kind in the world. It will replace the famous Allgemeines Krankenhaus in the Alserstrasse, and will be the largest hospital in Europe. It will consist of forty pavilions, as they are to be called—of which, however, the eighteen clinical institutes will be so many separate large hospitals, with the best possible arrangements for teaching purposes, demonstrations, etc. There will be room in each operating amphitheatre for 250 students. In the clinical institutes for infectious diseases the patient will be separated from both professor and students by a glass screen. Every clinical institute will have a large ambulatorium; and in each there will be flat roofs, where patients may lie in the open air whenever weather and temperature allow it. The whole area of the new hospital is nearly sixty acres, this being more than

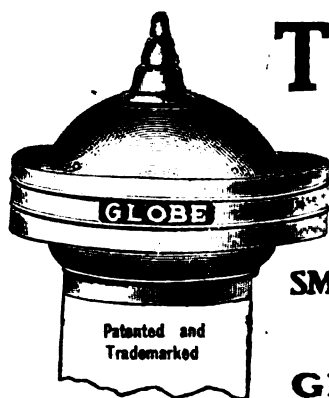
twice the area of the present Krankenhaus; but there will be fewer beds. Forty-eight acres, or about four-fifths of the total area, will be turned into gardens. The estimated cost of the institution, which it will take ten years to finish, is forty million kronen; but the authorities will be satisfied if the work can be done for forty-eight million kronen, about \$10,000,000.—*N. Y. Evening Post.*

**SPANISH CATHEDRALS.**—According to the usual arrangements of Spanish cathedrals external effect and symmetry seem never to have been studied. There is generally a parish church, called the *sagrario*, opening into the cathedral, and often a *capilla real*, having separate priests and services. At Santiago the nave is very long and the transepts considerable, all uniform and remarkable for having a triforium but no clerestory; the vault is very plain and the aisles are continued along the transepts. Like most Spanish churches the interior is very dark; the west doorways are most elaborate, within a modern porch. All Spanish cathedrals are arranged in the same manner, the *coro* with its stalls occupying a considerable portion of the nave, west of the transept and enclosed on three sides, thus greatly injuring the internal effect and blocking up the altar. The *capilla mayor*, or *sacrarium*, usually occupies only one bay eastward of the transept, and is enclosed with iron railing. The open space formed by the transept and centre of the cross between the *coro* and the altar is occupied by the congregation, and called "*entre los dos coros*." There is always an immense *rearedos* or *retablo* behind the high altar, often gaudy and ugly, but sometimes, as at Seville and Toledo, of rich and beautiful wood-carving. There are two organs placed on opposite sides of the *coro*. This arrangement utterly precludes any general view of the high altar, and the large iron grating, often reaching to a great height, is usually closed. The wood-carving of the stalls is often very fine, though of Renaissance character.—*The Architect.*

**SPONTANEOUS COMBUSTION IN PILE OF POSTERS.**—Inspector Stearns, of the New Hampshire board, informs the *Boston Standard* of a somewhat novel hazard which he encountered recently. A quantity of posters, about thirty by forty inches in size, printed in red ink on cheap white paper, were stored in the basement of a Manchester (N. H.) store preparatory to using. When one of the clerks visited the basement to get some of them for use in the store windows on a recent Saturday evening, he found to his astonishment that the pile was so hot that he could not bear his hand upon it. The poster had been printed about fifty hours and had not been exposed to the sun's rays. Had this stock been left over Sunday, Manchester would doubtless have had another fire of "rats and matches," "electric wires," or "cause unknown" stamp. It would be interesting to know something in detail regarding the chemical action in a combination of red printer's ink, cheap white paper and moisture under moderate pressure.

**THE CELLULOID HAZARD.**—In commenting on the subject of the hazard of celluloid stocks, the *Financial Chronicle* says: "A recent disastrous fire at St. Petersburg further emphasizes the serious danger caused by the presence of celluloid goods in stocks, even when restricted to quite moderate quantities. One evening shortly before Easter a fire broke out in a basket of celluloid goods on the ground floor of a large fancy-goods establishment, while business was in full swing, and spread with incredible rapidity throughout the building, resulting in loss and injury to life, as well as the total destruction of buildings and stock of the value of over \$500,000. It has been clearly established that this fire occurred through the carelessness of a customer, who placed a lighted cigar on the edge of the counter, whence it fell into the basket of celluloid goods. The building was very massive, of so-called fireproof construction, the floors being of concrete and iron. As a result, however, (1) of the combustible contents, (2) of openings for stairs, etc., and (3) of unprotected ironwork, the whole building became rapidly involved, and partly collapsed, leaving nothing above the level of the ground but dangerous walls, which prevented any timely recovery of salvage from the flooded cellars. This disaster follows closely upon the fatal fire in the Boulevard de Sebastopol, Paris. Although in the latter case the fire apparently originated through a gas explosion in the floor under the celluloid comb workshop, the cause of the dangerous rapidity and intensity of the fire was clearly due to the inflammable character of the celluloid goods, which rendered it impossible for the workpeople on this floor and the occupants of the residential flats on the fifth and sixth stories to escape. The same lightning-like rapidity in the spread of a fire where celluloid goods are involved was also demonstrated in the fatal fire in Queen Victoria Street, of London, in June, 1902."

**ANOTHER SUGGESTION FOR A CHANNEL BRIDGE.**—Mr. Charles Leuthirie, in the *Revue des deux Mondes*, suggests that an aerial platform on tall supports, resting on a viaduct of concrete fifty feet below low-water level, could be constructed between the English and French coasts at a cost of about £9,000,000.



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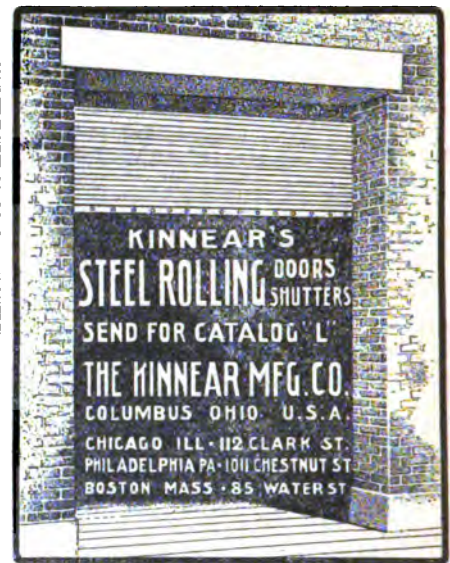


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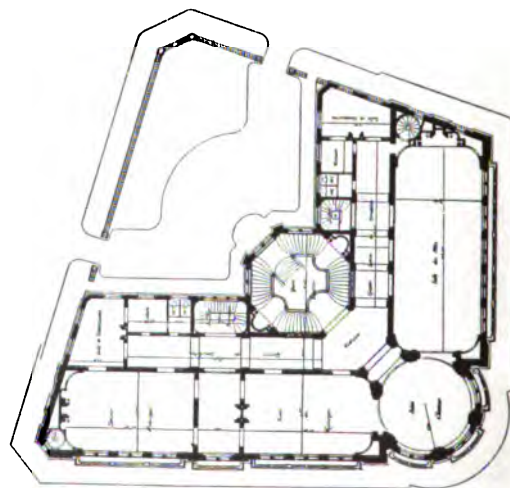
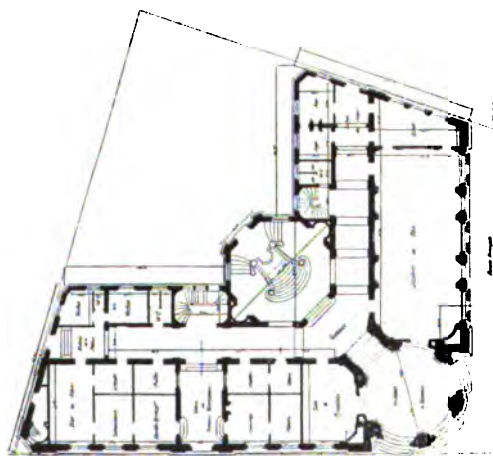
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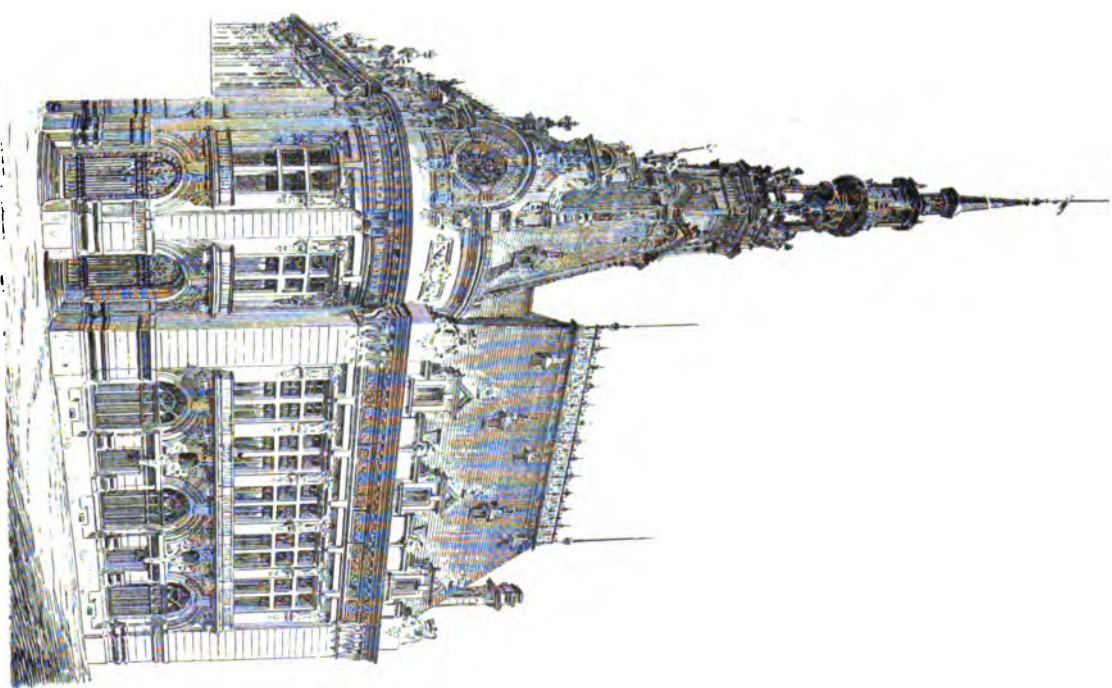
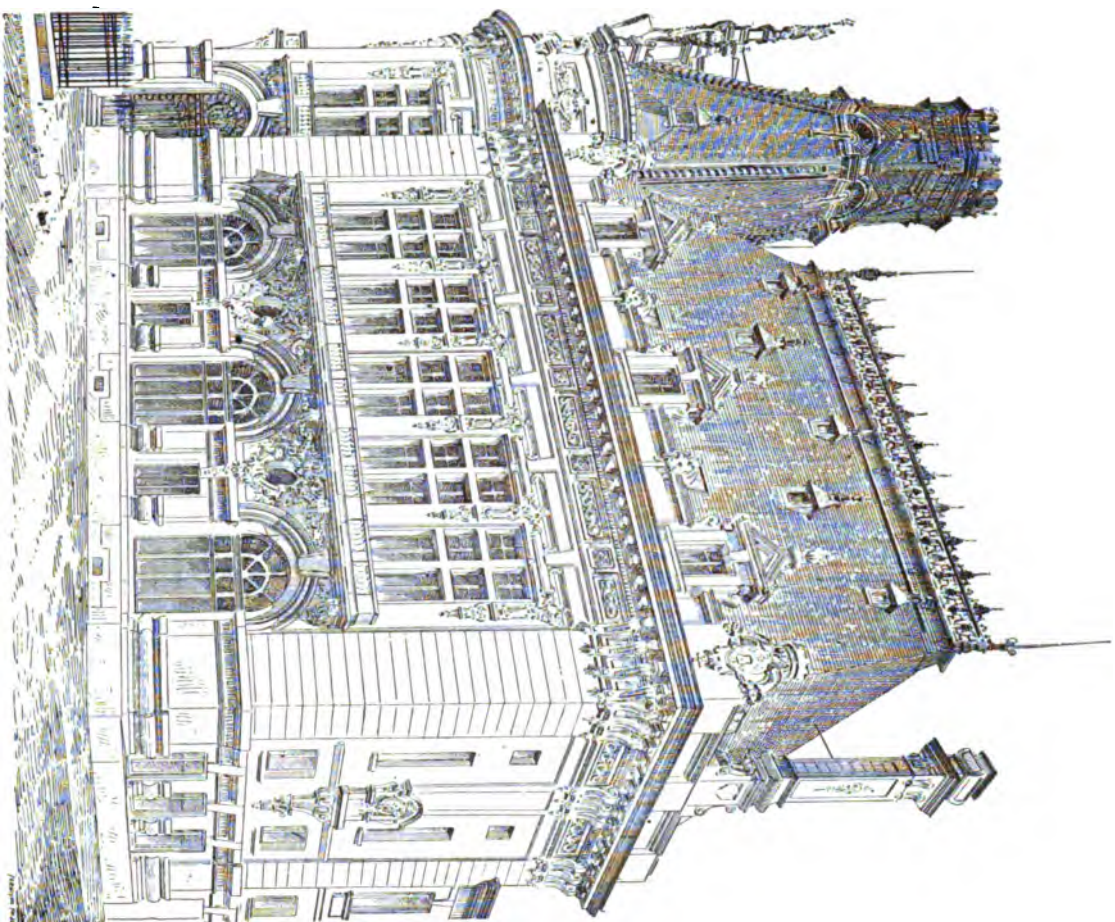






Revue de l'Architecture. — Paris.





*From l'Architecture.*

**The New Hotel De Ville, Paris, France.**  
*Dupont & Polvert, Architects.*

*The American Architect.*  
 July 30, 1904  
 No. 1492

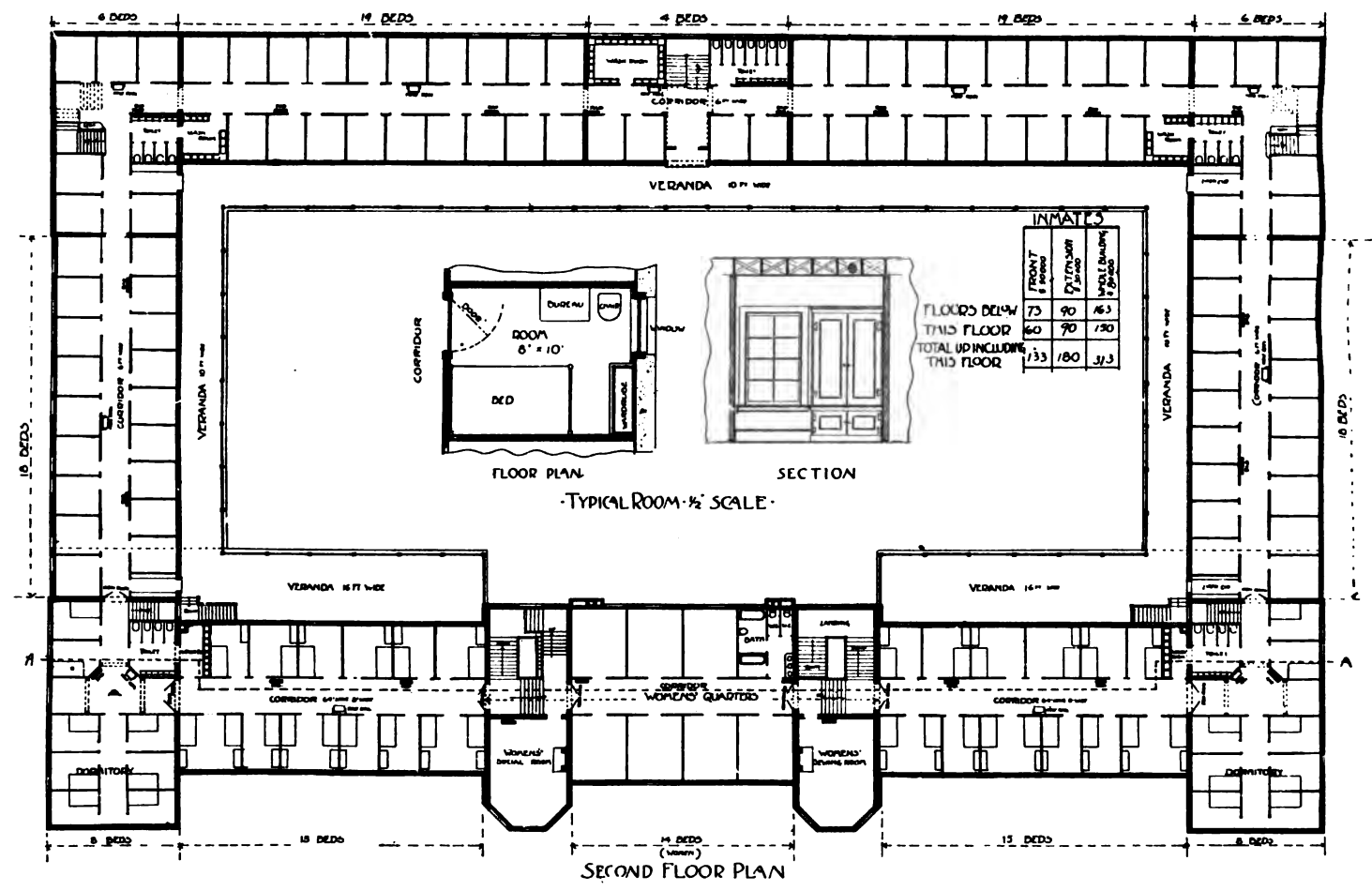
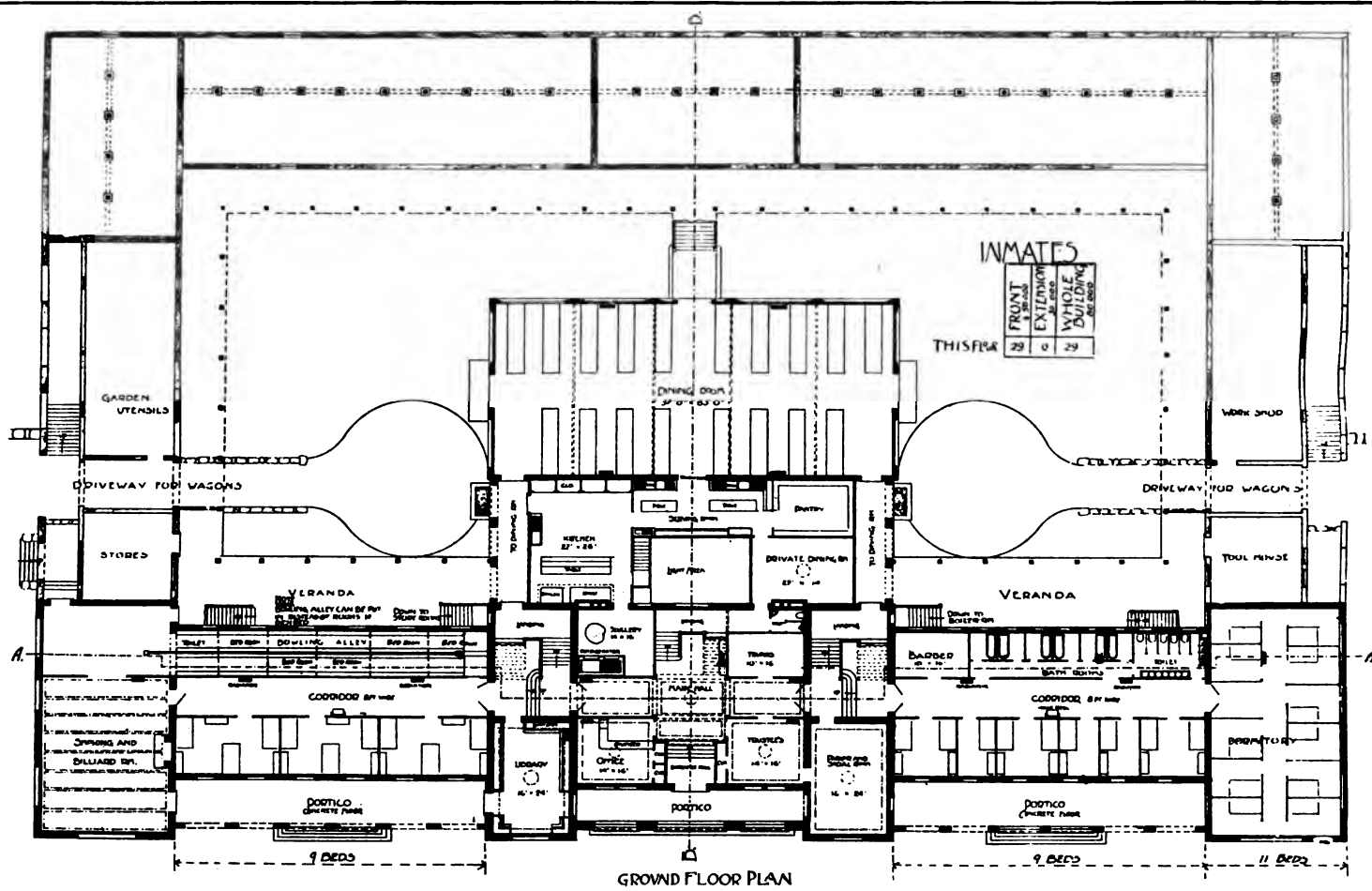












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OF ODD FELLOWS, SAN JOSÉ, CAL.  
ARCHITECT.

*The American Architect*  
July 30, 1904.  
No. 1492.





# THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. LXXXV

SATURDAY, JULY 30, 1904

No. 1492



## SUMMARY: -

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WISDOM has been shown by the new association of employers in Boston in launching their organization at a time when labor matters in the city are not in an effervescing state, and the good sense shown in the selection of the time of announcement, as well as the forethought shown in effecting an efficient organization before the advent of any serious trouble, makes us hope that the organization will continue to exhibit these desirable qualities and will not allow itself to copy the blunders which have detracted from the usefulness of the similar organizations in Chicago and New York. To use power simply because one has it to use is to misuse it. But this very simple lesson seems one of the hardest for the ordinary mind to grasp and remember. It is the inability of the union-leaders to grasp this elementary truth that leads to the undoing of so many promising labor organizations—after they have done a vast deal of harm because of their misunderstanding of what it is right and permissible that they should undertake. No fair-minded and thinking man, even if bound by union oaths, can, before his soul's truth, take exception to the leading tenets of this new employers' organization, which is to set itself to uphold these principles: No closed shop; no restriction as to the use of tools, machines or materials (except such as may be unsafe); no restriction as to the number of apprentices or learners (when of proper age); no limitation of output; no sympathetic strikes and no boycotts. The new association has enrolled six hundred and fifty-eight members who employ some fifty thousand workmen in forty-eight distinct lines of business.

THE tender regard for the safety and welfare of the good public which the labor unions show is very touching, and one of them gave an exhibition of altruism last week which was hardly to be expected from men who, by insisting a while ago on an unreasonable rate of remuneration, forced their employers to

lose contract after contract to parties favored with a better labor market. The Central Federated Union, the International Association of Machinists and the Marine Trades Council filed last week with the Federal Steamboat Inspectors a protest against the owners of the steamship "St. Louis" being allowed to send their vessel across the Atlantic with one engine out of commission, the object of sailing in this condition being that the needed repairs might be made in the cheapest market, instead of paying the high cost which the American tariff and the American labor unions would oblige them to pay for the same work done in New York. Apparently, American ship-owners have advantages which do not accrue to their less peripatetic fellow-countrymen. Perhaps, if the labor-union philanthropists are very wide awake, they may succeed in compelling the "St. Louis" to pay the *advalorem* on manufactured iron or machinery for the British material and labor used in the repairs each time the vessel comes within our three-mile limit, and so get even with owners so recreant to American Principles.

SPEAKING of philanthropy, we do not believe that architects get half the credit they deserve for the self-sacrificing efforts they are unquestionably making to build fireproof and enduring buildings. Measurably, they are, as it were, helping to cut their own throats each time that they complete an indestructible building, for in the past the "fire-fiend" has proved a very good friend to architects, and the manner in which this friendship is acknowledged is shown by their flocking in numbers to the scene of his last rollicking display of good will to professionals who must perennially be in search of a job. But the New York *Evening Post* points out that fire is also a good friend to another class of the worthy poor, who also flock to the scene of their good friend's labors in their behalf. When all buildings are fireproof and indestructible, how are the thousands of humble homes in our cities to be kept warm that now depend for firewood on the wreckage from partly burned buildings? Like every economic problem, this matter of fireproof building has different aspects and affects widely separated interests.

WHY do not the great Continental nations disarm? The proper answer, probably, is not so much that they fear some one would take advantage of their defenceless state as that they fear the economic crisis that would follow the return to industrial life of the millions who are now maintained in industrial idleness by the work of others; and these others, even as things are, find it hard enough to find wage-returning occupation. Disarmament would glut every labor market in Europe and would compel a very large number of men to win their livelihood by acts of violence. Besides this, it would throw out of commission the vast number of plants that are now kept in operation to provide arms, clothing, food, vessels, fortifications and so on, for the military forces. Every one of these plants would probably be insolvent before it could find a new

channel through which to discharge its possible output. The same sort of industrial cataclysm would follow, should it be possible with a wave of the hand to replace our destructible with indestructible buildings. Carpenters would be out of a job and wood-working plants useless; masons and iron-workers would find now and then a new building to do, so that the increasing population might find housing; but that would give but partial employment to but a small fraction of the men who now make a living out of the vast building industries as at present conducted. Of course, indestructible buildings cannot be created out of hand, but the final outcome may be none the less certain for that, and the millions of building mechanics we now number amongst our fellow-citizens may come, in the course of a couple of generations, to be represented by only a few hundred thousand, after all our buildings become fireproof.

**T**HERE is, it seems to us, something repulsive and undignified in the situation revealed by the phrase too often seen in the newspapers in these days in connection with a labor dispute: "the matter may have to be referred to the President." Undignified because the time of the President of the United States should be too valuable to be spent over any labor union dispute; repulsive because there is ground for belief that any President who does spend his time upon such a matter cannot forget that Labor casts a large vote. All such disputes come within the purview of the law, and if none but the highest power as arbitrator will serve the occasion, it is a Justice of the Supreme Court who should be called in to act, for he, holding a life office, can afford to forget that the disputants are voters. The latest case of a threatened appeal to the President occurs at Washington, where a barrack building is under way. Need arose for another bricklayer, and as the work was being done in the District, for the Government and under Governmental supervision, he could only be obtained under the Civil Service rules. Accordingly, the highest man on the list was certified to the job. But he proved to be not only a colored man but a non-union man, and as soon as he appeared on the scene all the other bricklayers struck, as their rules did not allow them to work with a non-union man. So a union once more comes in conflict with the Government and acts and feels as if fully the equal of the Government in power and importance. It is to be hoped that the difficulty will be solved, simply and expeditiously, by finding that enough non-union men can pass the Civil Service examinations to "man the job."

**A**T the request of Mr. Frank Mills Andrews, who is to design the new State-house for Kentucky, we desire to say that, in our issue for June 25, we inadvertently did injustice to Mr. Theodore C. Link in attributing—on the evidence of an Associated Press despatch, as we remember it—the designing of the new Mississippi State-house to the first-named gentleman, when a little searching of the memory would have reminded us that Mr. Link was really its designer.

**A**ND speaking of State-houses—capitols, the newer States prefer to call them—it is rather amusing to find an architect at present engaged in designing a State-house for a State which is not yet in existence.

This curious piece of inverted enterprise has its scene in the territory beyond the Mississippi, where there is still chance to erect new States without subdividing old ones. A group of public-spirited citizens of Muscogee, in the Indian Territory, who evidently know the full value of house-lots in the neighborhood of the chief public building of a community, have clubbed their resources and propose to build in their township a suitable capitol and to have it ready for delivery, free of charge, to the new commonwealth at the time when, if ever, the present Indian Territory is taken into the sisterhood of States.

**S**OME twenty-five years ago there appeared on lower Mount Vernon Street, Boston, a little house that, for its quaintness and picturesqueness, attracted widespread interest. It was the house which Mr. Frank Hill Smith had just altered so as to fit it for a studio for himself and a dwelling for his family. Those who did not know that Mr. Smith had had architectural training in the office of Hammatt Billings wondered that any mere painter fellow could do so good a bit of architecture. Probably because of his architectural training Mr. Smith, who died last week at the age of sixty-three, became finally interested in mural painting, and he might fairly claim to be one of the pioneers in a branch of art in this country whose practitioners are now gaining in numbers very rapidly. Pleasant and companionable in manner, he had just the temperament that made it possible for him to follow out this line of work successfully, for, unlike those who produce only portraits and easel pictures, the successful mural painter must have a good bit of commercial instinct and must know not only how to execute his commission, but must know how to land it and then handle it in a business-like way. Amongst the largest of his mural paintings are those in the chamber of the House of Representatives in the new portion of the Boston State-house.

**A** CURIOUS happening, with a moral to it, occurred in New York the other day, when it was found needful to close the new bath-house in Seward Park a week after it was opened. In addition to the tanks, the building seems to have been fitted with more or less complicated shower-baths, with hot and cold water attachments, and these and other fixtures were so maltreated by the unruly denizens of the neighborhood, either through ignorance or malice, that a serious flooding of the building resulted. It seems to have been very like a case of pearls and swine.

**T**HE city of Denver, Colo., has recently adopted a new charter, one of whose sections provides for the creation by the Mayor of an Art Commission, which is to have control over all matters into which considerations of an artistic complexion properly enter. We do not know under what limitations the new body must act, but as two out of the six members appointed by the Mayor are women, it seems fair to infer that the city not only will have the benefit of those finer perceptions which the world is generally agreed to accord to women, but that there will be at least two members of the body who will in any given case be unlikely to have their conclusions affected by considerations of political expediency.

# "SECURA" FLOORING.

We find a forerunner of this horizontal-arch construction of



FIG. 1.

flooring in an American Patent, where there are stays in the hollow bricks in the direction of the line of maximum pressure to be expected, so that the pressure is transmitted to the girders, as it should be, in the form of a curve.



FIG. 2. OLD CONSTRUCTION.

This form of flooring, which is illustrated in Fig. 2, was introduced into various parts of Germany and Switzerland, and for some time had a certain amount of success. Yet, though the idea appears a good one as far as construction goes, it is accompanied by a number of drawbacks.

In the first place, it was only the very best material, such as clay from the Po valley, which could pass the elaborate mouth-pieces of the presses employed in manufacturing the bricks, and which did not crack on drying and baking. Many bricks, too, would be fractured in transport. In fact, very few factories were able to manufacture the bricks.

The second disadvantage was that the bricks were only made to suit a certain width of span. The spacing of the girders ought to be according to the nature of the flooring.

The greatest difficulty was, however, found in retaining the proper position, in obtaining the bricks at the right time and afterwards in supplementing missing quantities.

The inventor of the "Secura" Flooring wished to avoid all these drawbacks, but at the same time to retain the advantage of having the pressure of the separate bricks against one another taken up by slight stays and transmitted in the line of pressure to the girder. A further intention was to fill in the space between the girders according to requirements to a height not hitherto usual with the light, hollow bricks, if possible without employing any filling material. The following short description shows how this idea was carried out.

One brick in the horizontal arch presses obliquely against the adjoining bricks on either side. The angle depends upon the direction of the line of pressure. If we think of a brick which is quite hollow and submitted to a pressure in the direction of

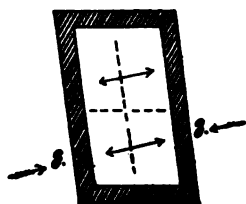


FIG. 3.

the arrow P, it will at once be cracked and fractured. Strengthening in the direction of the dotted lines will have but little effect; but if stays are inserted in the line of the internal arrows, we at once have the desired strength. The only pressure placed upon these stays is in the direction of their greatest strength, and they cannot be submitted to a sideways strain.

The "Secura" flooring can be constructed in three different heights of construction by employing two special sorts of bricks:

SIZE NO. 1.

SIZE NO. 2.

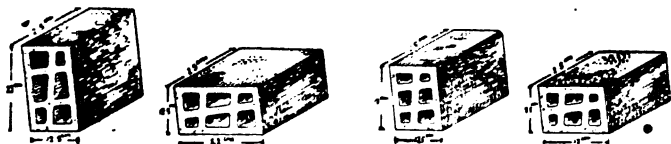


FIG. 4. FORMS OF BRICKS EMPLOYED.

- Flooring I. 22 cm high; brick No. 1, vertical.
- Flooring II. 17 cm high; brick No. 2, vertical.
- Flooring III. 12½ cm high; bricks Nos. 1 and 2, horizontal.

## FLOORING I.



FIG. 5.

## FLOORING II.



FIG. 6.

## FLOORING III.

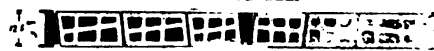


FIG. 7.

For the two ends and middle of the span, unless a béton filling is preferred, there are provided wedge-shaped bricks; one or two of these may be used as the keystone and one is used at each end of the span.

The number of bricks required on the average per square metre without the wedge-shaped bricks is:

Flooring I: About 25 bricks No. 1.

Flooring II: About 25 bricks No. 2.

Flooring III: About 10 bricks Nos. 1 and 2.

The weight of the flooring according to the official certificate is 220 kgm for No. I, 179 kgm for No. II, and 142 kgm for No. III.

The widths of span allowed in Germany by the Chief of Police are:

	LOAD		
	250	500	1,000
For flooring I.	3.10m	2.25	1.60
" " II.	2.95	2.15	1.50
" " III.	2.15	1.55	1.10

To secure a high construction with floorings I and II, it is very important to be able to effect an overlaying of the girders as shown in Fig. 8 (see also Fig. 1); for this purpose commencement bricks of special form are provided.



FIG. 8.

Some practical combinations are illustrated in Figs. 9, 10 and 11:

## ABUTMENTS.



FIG. 9.

## METHOD ADAPTED FOR FIXING WOODEN FLOORING.

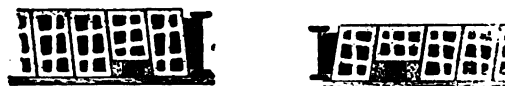


FIG. 10.

## ELEVATED CEILING.

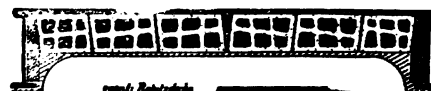


FIG. 11.

The General Direction of the Royal Bavarian State Railways at Munich have already made tests of the flooring to prove its power of resisting heavy loads and drops. The results have been exceedingly satisfactory. In Bavaria alone over 150,000 square metres of flooring have been contracted for in official and large private residences.

Below is given a testimonial of the President of Police in Berlin, with regard to the tests carried out in the new Patent Office:



"February 12th, 1904.

"Referring to your communication of the 5th ult., you are herewith advised of the results of the load and drop tests made with the 'Secura' Flooring of 1.61 and 1.98 m. span in the new building of the Imperial Patent Office, as described in No. 103 of December 26th ult., in the *Centralblatt der Bauverwaltung*.

"The results were thoroughly satisfactory, and corresponded to the results obtained from the test load experiments arranged by the Royal Technical College.

"The drop tests, in particular, which were repeated several times with an iron ball weighing 1 cwt., from a height varying from 2.50—6.50 m., proved that the 'Secura' Flooring, levelled-up with a cinder béton of 4—5 cm. in thickness (in accordance with condition No. 3 of Official letter of March 21st, 1903, 400 III. G. R.), possesses great power of resisting shocks and concussions.

ZACHER"

#### THE HOUSE OF LORDS ON THE CHANTREY BEQUEST.

THE subject of the Chantrey bequest came before the consideration of the House of Lords lately, on a resolution moved by Lord Lytton for the appointment of a Select Committee of the House to enquire into the matter, and, if necessary, to make recommendations. The motion was agreed to, apparently unanimously, though not without considerable difference among various speakers as to the general view of the subject.

We have already referred to Lord Lytton's recent article on the subject in the *National Review* as being logical and practically unanswerable, though we thought at the time that it was somewhat too polemical; and the tone and temper of his speech was more decisively so. He damaged his own case, as others of the Academy's critics have done, by exaggeration. To assert that the collection of pictures already purchased is "a mere by-word and a mockery," when the collection includes such works as Sir E. Poynter's "Visit to Æsculapius" and Brett's "Britannia's Realm," each of which might fairly be claimed as the finest picture its author has ever painted, is absurd and exaggerated. Still more so is it to assert that Millais' "Speak! Speak!", another of the purchases, is "the worst picture he ever painted." Even the worst of Millais is worth, for that matter, more than the best of many other painters; but to call that remarkable work his worst is mere temper or prejudice, and such assertions will not strengthen the hands of the Select Committee. Then we very much doubt whether the remark that no pictures by deceased artists had been bought is to the point. It is perhaps the one thing that is not made absolutely clear in Chantrey's will, whether he did or did not contemplate the purchase of works by deceased artists, as he did not in so many words prohibit it; but it seems to us unquestionable, from the general wording of the bequest, that what he contemplated was the purchase of new works of exceptional merit as an encouragement to English art; the object, as Lord Wemyss rightly said, was not to form a gallery but to encourage and stimulate English art; and with that object in his mind, no doubt the idea of the purchase of works by deceased artists was so far out of his thoughts that he did not see the necessity of even referring to it. We do not think that any logical and unprejudiced person could read the terms of his bequest without recognizing that as their implicit and necessary intent; and therefore that part of Lord Lytton's argument is of no value. Nor can we doubt that Chantrey contemplated, as part of the use of the fund, the purchase of exceptionally good works by hitherto unknown artists. One or two at any rate of the small works contemptuously referred to by Lord Lytton would come under that category, and are purchases much more justifiable than he is aware of. The really unjustifiable selections are not so much among the works of artists unknown or little known before, as among the commonplace and uninteresting works of men well known—as mediocrities; some of them Academicians. It is among such that the real and formidable mistakes have been made.

Lord Lytton's ideas as to what the proposed Committee could accomplish are reasonable enough. It could secure from the Academy, he suggested, "some answer to the charges brought forward and some explanation of the methods hitherto adopted." And if it found the charges well founded, it could make recommendations which the Academy might be willing to carry out, and so put an end to misunderstandings. In fact, the Academy could easily have anticipated and rendered unnecessary the functions of the proposed Committee if they had chosen to do so. That any one should think the appointment of the Committee a necessity is entirely the fault of the Academy themselves. Indi-

vidual Academicians, many of them, are most delightful and most reasonable people. But the Academy in its corporate capacity is one of the most self-opinionated bodies in existence. It will explain nothing and answer nothing, and treats all outside criticism as ignorant impertinence; and it is not surprising if public feeling is at last roused to some irritation at this defiant attitude. Lord Wemyss, in a speech intended to justify the Academy, said that so far from being opposed to an inquiry the Academy courted it. If so, why have they so obstinately refused to recognize any of the criticism directed against them, or to give any explanation of their action? This attitude of "court-ing inquiry" seems rather like making a virtue of what has at last become a necessity.

Lord Davey, who spoke as one of the present Chantrey Trustees, after repeating the statement that the Academy courted inquiry, also declared emphatically that the Academy were fulfilling the terms of the bequest in encouraging British art by purchasing able works by young and unknown artists. As already observed, we believe that was one of Chantrey's objects, shadowed forth in the terms of the bequest. But (only to quote two or three examples) it cannot be said that Mr. Pettie or Mr. Yeames were young and unknown artists, while it must be obvious that the works by them which were purchased were, to say the least, of very mediocre merit, while Calderon's "Elizabeth of Hungary," another purchase, is ridiculous and even worse.

Lord Windsor, in a well-considered reply on the part of the Government, admitted that a *prima facie* case for inquiry was made out, and was of opinion that a committee appointed by the House would make it perfectly clear that the Academy, in confining their purchases to pictures exhibited at their own annual exhibitions, were "taking too narrow a view of their duty and placing an unnecessary limit on their freedom of choice." That is at all events clear to every one. Reasoning from results, one would be inclined to say that there has been something more than that to complain of; that the Chantrey Bequest has been practically regarded as a kind of *bonne bouche* to be doled out to Academicians in rotation; A's picture being purchased one year, B's the next, C's the next; and so on in friendly rotation. If that has not been intended, the Academy have been unfortunate enough to give a good deal of excuse for such a supposition; and whether intentional or not, the result is obviously wrong and contrary to Chantrey's intention. In other words, if A's pictures were decidedly better every year than B's or C's, they ought to have been purchased every year, without any consideration of making things pleasant all round, which was certainly no part of Chantrey's object.

One curious feature in the debate may be noted—that neither those who attacked nor those who to some extent defended the Academy, seem to have had any perception of what is really the most serious fault in their administration of the Chantrey fund, viz.: their almost entire neglect of sculpture. This year they have shown signs of awaking to the fact, and have purchased an important piece of sculpture, though hardly one of the highest rank; but sculpture has been very much neglected. This is the more to be deprecated, because sculpture is one of the arts which is least understood and is most in want of encouragement in England; and the case for sculpture is certainly strengthened by the consideration that the founder of the bequest was himself an eminent sculptor. In this respect, even if in no other, the fund has been ill administered; and the mistake is only too characteristic of a body of whom the numerical majority are painters, and which is in fact not so much an "Academy of Arts" as an Academy of Painting.—*The Builder*.

#### THE LEGAL ASPECTS OF THE TRADES UNIONS AND TRADE DISPUTES BILL, 1904.<sup>1</sup>—II.

THE first section of the Bill would leave untouched the first of the three propositions in which we have summarized the existing law.<sup>2</sup> It would alter the law contained in the second of these propositions in cases where a persuasion to break a contract was "an act done in contemplation or furtherance of a trade dispute."<sup>3</sup> It would not then be necessary, as it is now, to show that there was some lawful justification for the interference with an existing contractual right. It is more doubtful whether the

<sup>1</sup> A paper by Professor W. S. Holdsworth, D. C. L., Barrister-at-law, published in the *Architect*. Continued from No. 1490, page 23.

<sup>2</sup> Peaceable persuasion not to enter into contracts with another person is, and still will be, perfectly lawful.

<sup>3</sup> Peaceable persuasion to break an existing contract—persuasion, that is, to interfere with existing contractual rights—would not, under these circumstances, be actionable.

section would have the effect of altering the law as expressed in the third proposition.<sup>1</sup> In the class of cases which fall under this category the acts are no doubt acts which interfere with "the exercise by another person of his right to carry on his business, or with the establishment or continuance of contractual relations between other persons;" but the liability is grounded not so much upon the interference as upon the nature of acts in themselves unlawful, by means of which the interference is effected. "What may begin as peaceable persuasion may easily become, and in trades union disputes generally does become, peremptory ordering, with threats open or covert of very unpleasant consequences to those who are not persuaded. Calling out workmen involves very serious consequences to such of them as do not obey. Black-lists are real instruments of coercion, as every man whose name is on one soon discovers to his cost."<sup>2</sup> Probably actual threats and coercion will not be legalized by this section. It is acts of this kind that the proviso at the end of the section is probably intended to cover. If this interpretation is placed upon this clause, its effect will be slight. It will not empower trades unions to force workmen or others to work only upon such terms as the union chooses to dictate. It will merely legalize such interference with the course of business as may be caused by peaceable persuasion to break existing contracts, provided such persuasion does not amount to a nuisance and is not in other respects wrongful, and provided that the acts of interference occur in contemplation or furtherance of a trade dispute. If any larger interpretation were placed upon the section, if it were supposed to overrule cases of the type of *Quinn vs. Leatham*, it would be difficult to attach any meaning to the proviso to the section. And as the Lord Chancellor said,<sup>3</sup> if the law gave no remedy for damage caused by acts of that kind "it could hardly be said that our jurisprudence was that of a civilized community."

The second section provides that "an agreement or combination of two or more persons to do or procure to be done any act in contemplation or furtherance of a trade dispute shall not be a ground for an action, if such act when done by one person is not a ground for an action."

This section enacts for the civil law of conspiracy what was enacted for the criminal law of conspiracy by the Conspiracy and Protection of Property Act, 1875. It is a little difficult to see what result can be effected by the section. The essence of a criminal conspiracy is an agreement of two or more persons which is for some reason unlawful. It is the illegal agreement which is punishable as a conspiracy. One person cannot be indicted criminally for conspiracy. A section therefore which enacted that "an agreement or combination by two or more persons to do, or procure to be done, any act in contemplation or furtherance of a trade dispute between employers and workmen shall not be indictable as a conspiracy, if such act committed by one person would not be punishable as a crime," has a perfectly clear meaning. But the essence of a conspiracy regarded as a civil wrong is the resulting damage to the person affected thereby. If damage results from the action of one man, that man is liable in an action just as much as if he had acted in combination with others.<sup>4</sup> If damage results from the joint action of several, it is conceived that an action will lie just as if the damage had arisen from the act of one person. It would be no answer to say that the acts of A, B, C and D taken singly would furnish no ground of action, and that therefore they cannot be sued for conspiracy. Their joint act, if done by one person, would have been actionable, and therefore they will still be able to be sued. This difference between the civil and the criminal law of conspiracy seems to have been overlooked by the framers of the Bill, with the result that the section produces no result at all.

The third section provides that "an action shall not be brought against a trade union or against any person or persons representing the members of a trade union in his or their representative capacity."

This section is intended to override the decision of the House of Lords in the famous *Taff Vale* case.<sup>5</sup> In that case, contrary to the received opinion, the House of Lords, affirming *Farwell, J.*, and overruling the Court of Appeal, held that a trade union could be sued in its registered name. Before that case was decided it was thought that a trade union, not being incorporated, could not be sued. The House of Lords, however, held that the Legis-

lature, though it had not incorporated a trade union, yet as it had "created a thing which can own property, which can employ servants and which can inflict injury, it must be taken to have impliedly given the power to make it suable in a court of law for injuries purposely done by its authority and procurement."<sup>6</sup> The decision really amounts to this, that a trade union is not above the law. The proposed clause would go far to produce this anomalous result. It is said indeed that, if this be the law, part of the funds of a trade union which are subscribed for benefit purposes may be taken, and that the widow and orphan will suffer. The remedy for this is not to put trade unions above the law; it is to separate that part of their funds which are to be used for benefit purposes from the part which is to be used for trade purposes. This course was suggested in 1869 in the report of the Royal Commission on Trade Unions; but it was rejected by the advocates of trade unions on the ground that it would paralyze the efficiency of such unions.

To override this decision is no doubt the chief aim and object of the clause. But the clause itself is quite general in its terms. It may relate also to actions against trade unions by the members of such unions, as well as to actions by the other members of the community.

The position of a trade union in respect of such actions is peculiar. It depends upon the provisions of the Trade Union Act, 1871. Before the passing of that Act all such combinations were illegal because they were in restraint of trade. The members could not hold property or enforce rights to property. They could not prosecute officials who misappropriated their funds. The Act of 1871 provided that a trade union should not be unlawful merely because it might involve a restraint of trade. But the Act expressly disabled the members of trade unions from enforcing their rights *inter se*. "If that had been intended, the result would have been this, that an agreement between a number of workmen once entered into, compelling them to work in a particular manner, or to abstain from working in a particular manner, would have been enforceable according to law, and to a certain extent would have reduced some portion of the workmen to a condition of something like serfdom and slavery."<sup>7</sup> The Courts have held that this clause of the Act of 1871, though it prevents any member from bringing an action to enforce any claim he may have against the trade union under the rules of the union, does not prevent legal proceedings being taken to restrain misapplication of its funds. Such proceedings do not enforce the claim of any individual member to the funds; they simply protect those funds, and thereby compel the trustees of the union to do their duty under the rules of the union.<sup>8</sup>

It seems likely that this section would override these cases. This would be a small matter beside the exempting of trades unions from any kind of liability for acts which damage the outside public. If the members of trades unions choose to deprive themselves of any remedy for the misapplication of their funds that is their own affair. To deprive members of the public of any remedy for illegal acts done or authorized by trade unions is a very different question. It does not, however, appear in that light to the extreme advocates of trade unionism. Entire freedom from any kind of legal restraint appears to be the object at which they aim. In the minority report of the Labor Commission which reported in 1894,<sup>9</sup> it is said: "One proposal made to the committee by several witnesses appears to us open to the gravest objections. This suggestion is that it would be desirable to make trade unions liable to be sued by any persons who had a grievance against the action of their officers and agents. To expose the large amalgamated societies of the country with their accumulated funds . . . to be sued for damages by any employer in any part of the country, or by any discontented members or non-unionists for the action of some branch secretary or delegate, would be a great injustice. If every trade union were liable to be perpetually harassed by actions at law on account of the doings of individual members; if trade union funds were to be depleted by lawyers' fees and costs, if not even by damages and fines, it would go far to make trade unionism impossible for any but the most prosperous and experienced artisans. The present freedom of trade unions from any interference by courts of law—anomalous as it may appear to lawyers—was, after prolonged struggle and Parliamentary agitation, conceded in 1871, and finally became law in 1876. Any attempt to revoke this hardly-won charter of trade union freedom, or in any way to

<sup>1</sup> I. e. in cases where persons are induced either not to contract or to break an existing contract, not by mere persuasion, but by coercion.

<sup>2</sup> Per Lord Lindley, L. R. 1901, A. C. at p. 538.

<sup>3</sup> L. R. 1901, A. C. at p. 506.

<sup>4</sup> *Giblan vs. National Amalgamated Laborers' Union*, L. R. 1903, 2 K. B. at p. 619.

<sup>5</sup> *Taff Vale Railway vs. Amalgamated Society of Railway Servants*, L. R. 1901, A. C.

426.

<sup>6</sup> *Ibid.* at p. 436, per Lord Alsbury.

<sup>7</sup> Rigby vs. Connell, 1880, L. R. 14 C. D. at page 490.

<sup>8</sup> *Howden vs. Yorkshire Miners' Association*; L. R. 1903, 1 K. B. 308.

<sup>9</sup> Before the *Taff Vale* decision had established the liability of trade unions.

tamper with the purely voluntary character of their association, would provoke the most embittered resistance from the whole body of trade unionists."<sup>1</sup>

It will be clear that the two grounds upon which proceedings can be taken against trade unions are here confused. But it cannot be too much insisted on that between proceedings by members of the union to enforce the proper application of the funds, and proceedings by members of the public to get damages for illegal acts done or authorized by the trade union, there is no analogy. To allow such proceedings by members of the public does not interfere with the "voluntary character of the association." It simply compels such associations to obey the laws to which all citizens are subject. If the necessity to obey the law renders their existence impossible, it is better that they should not exist.

The fourth section enacts that "attending at or near the house or place where a person resides, or works, or carries on business, or happens to be, or the approach to such house or place, in order peaceably to persuade any person to do or abstain from doing that which he has a legal right to do or abstain from doing, shall not be deemed a watching or besetting within the meaning of section 7 of the Conspiracy and Protection of Property Act, 1875." This clause is aimed at the decision of the Court of Appeal in *Lyons & Sons vs. Wilkins*. In that case it was held that the picketing of an employer's place of business in order to persuade people not to work for him is a "watching or besetting" with a view to compel persons to abstain from doing a lawful act within section 7 (4) of the Conspiracy and Protection of Property Act, 1875. It is easy to see that such "peaceable persuasion" will soon cease to be peaceable. To allow it at all is to provide occasions for breaches of the peace. If the trade union tries to peaceably persuade, why should not the masters? How long will the peace then be kept? The effect of this clause would seem to be to allow explosive materials to be brought together in an inflammable atmosphere.

The effect of the clause will not, however, be quite what the marginal note to the section seems to imply. The marginal note states that the section deals with "the legalization of peaceful picketing." It will be, however, observed that such picketing only ceases to be a criminal offence within the Conspiracy and Protection of Property Act, 1875. The civil remedy will, it is apprehended, be left intact if a nuisance is thereby caused. "The truth is that to watch or beset a man's house with a view to compel him to do or not to do what is lawful for him not to do or do is wrongful . . . unless some reasonable justification of it is consistent with the evidence. Such conduct seriously interferes with the ordinary comfort of human existence and ordinary enjoyment of the house beset, and such conduct would support an action on the case for nuisance at common law. Proof that the nuisance was peaceably to persuade other people would afford no defence to such an action. Persons may be peaceably persuaded provided that the method employed is not a nuisance to other people."<sup>2</sup> Such acts will not be legalized by the first section of the bill, because they will come within the proviso to that clause. Though the substitution of a civil for a criminal remedy is a poor exchange when the party sued is unlikely to be able to pay damages, yet it is some consolation to reflect that the fact that such conduct amounts to a nuisance will be sufficient ground for the grant of an injunction.

The bill, if carried as it stands, would go far to put illegalities committed or authorized by trade unions beyond the reach of the law. Some of the clauses of the bill, taken singly, will not, it is true, produce much effect. The third clause, which exempts trade unions from liability to be sued, will amply compensate for any deficiency. A right to sue for damages or a right to get an injunction is of little avail if the person as against whom such right exists is sufficiently obscure. Unless the powerful organization which stands at the back of these obscure individuals can be reached, there is no practical remedy for illegal acts which may affect most seriously the trade of the country, which may seriously impair the right of the workman to contract freely. It is no new thing that persons and bodies who have but recently acquired power should wish to see that power unlimited. At one period of our history the Crown, and at another the House of Commons, have attempted to place themselves above the law. Such attempts have been defeated, and the law has remained supreme. To exempt any class or body from the law would be more than an anomaly; it would be an attack upon the first prin-

ciples of the Constitution itself; it would go far to establish a tyranny.

### FRENCH CHURCHES IN PERIL.<sup>3</sup>

IF the French Chambers decide upon the separation of Church and State, that measure may imperil the monuments which have contributed so much to the wealth and the glory of France. It is high time we gave the matter serious consideration.

Is separation inevitable? The prophets disagree. Beyond doubt, among the enemies of religion, as among the Catholics and the Protestants, such a rupture would please only a small minority. But in every party the sober-minded masses always wind up by following, sheep-fashion, some hot-headed demagogue. It may well happen that, without anyone's desiring it, the people will vote for separation; the more absurd the proposition is, the more likely it is to come to pass. And unless those who are interested in seeing the artistic renown of France maintained band themselves together in advance for the preservation of religious edifices, we shall then behold some pitiful disasters.

The society known as the Art Sacré showed commendable shrewdness in calling public attention to the fate which threatens the French churches in the form of a separation law. This is the beginning of a campaign which may yet have a restraining influence upon the radical politicians. It would, of course, be puerile to rely upon their taste or their artistic zeal. But there are those among the Socialists who decline to be confounded with men of that ilk. "We are no barbarians!" they cry. They are therefore occasionally capable of refraining from acts of vandalism, provided care is taken to call their attention to the matter, and especially if that noble attitude is fraught with no political perils. Very well; let us appeal to them.

It is well known that numerous and widely-varying bills have been brought forward in the Chamber to regulate the separation of Church and State. For instance, and I overlook the others, there is the Briand bill. Should the present Chamber ever vote separation, it is highly probable that it would adopt M. Briand's idea. According to this bill, the commune, which is the owner of the church, cannot sell it outright, but must rent it for a period of ten years, to a religious society as a place of worship. The ten years ended, the commune is to take full possession of the sacred edifice and may then dispose of it entirely, or may choose whatever tenant may be most convenient, the church thus becoming a market, a lecture-hall, a theatre, a café-concert, or what you will. If such a bill as that is passed, what is to be the fate of the churches of France?

Happily it is certain that the great cathedrals will not be menaced. We have nothing to fear for Chartres, Amiens, Bourges, Reims, Rouen or Paris. "The cathedrals will look out for themselves," said M. Aynard in his address before the Art Sacré, and I quite agree with him. Nevertheless, the moment the "budget des cultes" is suppressed it will be a matter of prime necessity to provide for their maintenance by a modification of the law. Of late years the cathedrals have figured upon the list of historic monuments, but purely "honoris causa." They are not supported, like other historic monuments, by the Service des Beaux-arts; they have their own architects and their own special budget. They are diocesan buildings, and their preservation rests with the governmental direction of public worship. An appropriation of 1,789,000 francs provides for them.

Besides, there is now nothing whatever to justify this overlapping of jurisdictions save a stupid and costly bureaucratic tradition. Separation once accomplished, there will no longer be a budget des cultes, and there will no longer be any diocesan buildings. The cathedrals will revert to the Ministry of Fine Arts. It will then be necessary to transfer the 1,789,000 francs from the budget des cultes to the budget des beaux-arts. The "Service des Édifices Diocésains" permits and encourages scandalous restorations. The "Service des Monuments Historiques" is more cautious and more reserved, spending its money less irrationally.

A certain number of churches are classified under the law of 1887, and they will still be looked after by the Service des Monuments Historique. The commune will be responsible to the State for any infraction of the law as regards them. Only we want this surveillance exercised severely, so that political considerations can never interfere with it, and so that a mayor like M. Pourquery will no longer find a minister like M. Leygues ready to play accomplice to his vagaries.

<sup>1</sup> The minority report was signed by Messrs. William Abraham, Michael Austin, James Mawdesley and Tom Mann.  
*Lyons & Sons vs. Wilkins*, L. R. 1899, 1 Ch. at pp. 267, 268, per Lord Lindley.

<sup>3</sup> Translated by the Boston Transcript from the French of Andre Hallays in *Le Journal des Débats*.

We may then doubtless proceed to a revision of the list of French churches and to increase the number of those hereafter to be subjected to classification. But we must not go too far in that direction. If we multiply the number of classified churches we shall have to multiply the inspectors. Besides, the law of 1887 grants State protection only to "buildings whose preservation may have a national interest, either from the historic or the artistic point of view." To extend this protection to the innumerable churches scattered throughout France would be to exceed the letter of the law. They have associations infinitely touching and infinitely precious to those who live beneath the shadow of their towers, but these associations are not directly connected with the nation's history. They are charming and delicate structures, but it cannot be said that the entire nation is interested in the preservation of each particular one of them.

And yet their disappearance would be a public calamity! For in our villages these humble churches are the sole witnesses of the art of the past. Ancient hôtels de ville are rare in France. Our modern town-halls are miracles of repugnant banality. Our primary schools are architectural mediocrities. Is democracy, not content with its powerlessness to create a popular art, determined to legislate away the only remaining monuments which, built by the people and for the people, might awaken in them a feeling for beauty?

To save these thousands of Romanesque, Renaissance and Gothic churches, which are the adornment of France, there is only one effectual means, and that is the preservation of their religious character. As long as they are consecrated to worship, the faithful will see to it that they are kept in repair. A laicized church is a church destroyed. In many cities (Loudun, Senlis, Guebwiller) convent chapels and parish churches have been turned into markets, and it is a lamentable spectacle they present to-day, with their broken sculptures, mutilated vaults and effaced paintings.

The ten years' truce granted to the churches is a derisive concession. The law will be a law of savages, if it is stipulated that a church shall remain a church only so long as Christians come thither to pray and worship in conformity with the traditional rites and liturgy. This is not a question of politics or of liberty of conscience. Whoever deliberately destroys the beauty of a work of art commits a crime against civilization. Now, who will deny that the little churches of France are works of art, and who will pretend that they can be alienated from worship without an assault upon their beauty?

Moreover, even if the law should take the form which we might desire, and which the vandals promise, they would still do their work. The Catholics are the first to realize that in several dioceses it will be easy to reduce the number of cures, and that a single priest can readily serve several villages. If separation comes to pass, they will carry out this reform and many parishes will be sacrificed. Churches will then be abandoned; others will become mere succursals, and it is a question whether the faithful will be zealous enough to maintain their church when it is reduced to the rank of a chapel. In a word, ruins will abound. Hence it becomes gravely essential for the public to realize that the separation of Church and State may become the signal for a campaign of abominable vandalism.

If anti-clerical prejudice prevents the deputies from taking the only steps which definitely insure the preservation of the better part of our religious edifices, we shall have to contrive some other means of bringing those monuments under the safeguard of the law.



[Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.]

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BECKFORD'S TOWER, LANSDOWN, BATH, ENGLAND.



THE FOURTH "R."—At a largely attended meeting of teachers in London the other day, Mr. Mosely said that "the broad-minded way in which American engineers in South Africa tackled the propositions brought before them was what first excited his interest in the system of education in the United States." He believed that it was the fourth "R" which was at the bottom of education in this country. "Children are taught not only how to read, but how to reason." This was the spirit which permeated the whole nation and largely helped to build up its commercial success. Professor Armstrong deprecated the tendency here to make our manual training schools into trade schools—"a magnificent metal workshop here and a magnificent wood workshop there." What would be more useful was a training for a variety of occupations with reference to local requirements.—*N. Y. Evening Post*.

FIRE CISTERNS.—Springfield, O., seems disposed to repair and utilize the twenty-six old fire cisterns, which have been closed since the waterworks system was installed in the city. Chief Hunter, of the fire department, favored the plan, on the ground that the cisterns give much better facilities for fire-fighting than the present method of attaching the steamers to the fire-plugs. He says cisterns are not out of date, and that several cities, including Cincinnati and Columbus, are having new cisterns built. He would connect the old cisterns with laterals to the water mains, the laterals to be fitted with a valve, so that the engineer can turn the water on at will, and be furnished with a steady supply. The water-works pressure is sufficient for ordinary fires, but under certain circumstances it would prove wholly inadequate. Three engines can pump from one cistern at one time and furnish all the water wanted at a sufficient pressure to flood any building in the city. He added that, in case several engines should be pumping from the water mains direct at one time, and some of them were temporarily suspended, it would be likely to burst the main and completely disarm the department.—*Fire and Water Engineering*.

PROPOSED HEIGHTENING OF THE ASSUAN DAM.—Such has been the success of the Assuan Dam on the Nile, that a scheme has been formulated to increase its height by nineteen feet and a half. The realization of such an idea will enable the Irrigation Department to retain behind the barrage an additional thousand million cubic metres of water, which will suffice for an increase to the perennially irrigated area of half a million acres and add \$75,000,000 to the wealth of Egypt. According to the recently published report of the Assuan reservoir compiled by Sir William Willcocks, late director-general of reservoirs, the whole of the water kept back by the dam has been devoted to special tracts, and the Egyptian government cannot entertain any applications for water. The cost of raising the barrage will involve an expenditure approximating \$2,500,000, which sum will be defrayed out of the public debt surplus.—*Boston Transcript*.

SWEDISH PEAT.—There are 8,648,640 acres of moss land in the province of Norrbotten, Sweden, not including 1,235,520 acres at Pajala and the peat deposits near the coast, and it is not at all improbable that a fifth of this area is covered by peat moss of considerable depth. Calculated at a low fuel value this would correspond to a supply for two hundred years of the present coal import to Sweden.—*Exchange*.

SANCTUARY ON A CHIMNEY.—For the past ten days the town of Newry, in Ireland, has been convulsed over the curious strategy by which a small contractor, named James Gill, has defied the efforts of the police to enforce the penalty of a 40s. fine, or a month's imprisonment, to which he had been sentenced for drunkenness. The man had recently undertaken the demolition of a factory chimney, round which the scaffolding necessary for the work had been erected, and he sought security from the clutches of the authorities at the top of this structure, climbing by means of a short ladder, which he drew up after him as he reached each successive platform of the staging. Food and drink are furnished to him by his son, and raised to the summit of the chimney by an ingenious device. The other evening Gill managed to descend to the ground and reach his home unobserved, but he returned to



his lofty perch early Monday morning. Large crowds of people have flocked from all the country round to Sugar Island, where his hiding place is situated, and the police have now resigned themselves to waiting till the work of pulling down the chimney is completed before attempting to arrest him.—*Reynolds's Newspaper*.

**CHURCH OF THE VAL-DE-GRACE, PARIS.**—Many English architects have visited Paris without seeing the Church of the Val-de-Grace. It has served of late years in connection with the military hospital. When we remember the number of architects engaged on its erection, and that the style is in florid Renaissance, the unity which appears throughout is remarkable. It was intended as a thank-offering by Anne of Austria for the birth of Louis XIV. He laid the foundation-stone in 1645, but twenty years elapsed before the building was completed. The original architect was Francois Mansart, but he died when the building was not more than 25 feet above the ground. It was continued by Le Mercier as far as the cornice, and Lemuet, Gabriel Leduc and Duval were engaged upon it. It was one of the first buildings to suffer under the First Revolution. It was converted into a military hospital, as well as the monastic buildings connected with it. Joseph Woods, the architect, describes it as a warehouse in 1816. In 1826 it was restored to ecclesiastical purposes. The dome was no doubt suggested by that of St. Peter's at Rome, and in its turn suggested the dome of the Invalides. The interior has long been stripped of the furniture and accessories which impart an effect of richness to many Parisian churches. The dome, however, still exhibits the army of saintly figures painted by Pierre Magnard, and which are said to number over two hundred, each of an average height of more than seven feet. In the church the remains of Queen Henrietta, the wife of Charles I, were deposited. The building stands in the Rue St. Jacques, and at some distance from the Boulevard St. Michel. It is therefore a part of the Quartier Latin. It is now recognized that justice is not done to the structure by its surroundings, and it has been arranged to make it abut on a semicircular place when the merits of the building will be more appreciated and the church will become of higher value as an element in the amenity of Paris.—*The Architect*.

**BENEDICT ARNOLD AND THE OHIO "FIRELANDS."**—Unnumbered native Ohioans, not to speak of hundreds of thousands of residents of this State who have come from foreign lands and other States of the American Union, must have wondered why a fertile and productive tract in northern Ohio, a district which in no way hints of the ravages of fire, should be called the "Firelands." Among all the vicissitudes of Ohio's early history great conflagrations were notable for their absence. No such terrible forest fires swept this State as ravaged large areas in Michigan and Wisconsin seventy or eighty years later. The fires to which the name refers raged in Connecticut, not Ohio, and they were the work of British and Tory soldiers, instead of the result of accidents or natural causes. In 1781, when the long struggle for independence was nearly ended, Benedict Arnold commanded an expedition which ravaged the Connecticut coast of Long Island Sound. He burned New London and other towns and left behind misery and destitution, as well as a more bitter hatred than he had earned before that outrage upon his native State. This and other cruel and senseless attacks upon Connecticut towns left so strong a feeling of sympathy and injustice behind that in disposing of Connecticut's rights in lands now forming part of Ohio, 781 square miles in the extreme western edge of the Western Reserve were set apart to be donated to sufferers by the British raids. Five ranges of townships running north and south were included in this tract. Sandusky Bay and Lake Erie extend so far southward at this point that the five ranges of townships contained only about 500,000 acres of land. The tract measured some 27 miles by 30. The Connecticut sufferers from the torch of the enemy lived chiefly in New London, Norwalk and Fairfield, and it was from those towns that many of the settlers of the "Firelands" came to build in the Ohio wilderness settlements bearing the same names and having like civic ideals and character.—*Dayton Herald*.

**THE FINE ARTS AT THE ST. LOUIS FAIR.**—The total number of works exhibited by Americans, in the permanent central pavilion, is 3,534. Of these, 903 are oil paintings, 113 are mural paintings, 314 are water-colors and pastels, 90 are miniatures, 178 are illustrations, 268 are etchings and lithographs, 82 are wood engravings, 351 are sculptures, 290 are architecture and 945 are applied arts. The loan collection of art works from institutions and private collections (Group 13) was not catalogued in time for the first edition. The foreign countries are represented as follows: Argentine, 117; Austria, 498; Belgium, 287; Brazil, 167; Bulgaria, 44; Canada, 117; Cuba, 86; France, 1,443; Germany, 610; Great Britain, 1,433; Holland, 482; Hungary, 92; Ceylon, 55; Denmark, 25; Norway, 26; Italy, 378; Japan, 267; Mexico, 42; Portugal, 74; Sweden, 176. Owing to delay in shipping the Russian exhibits, the official list is not included in the first edition. The total num-

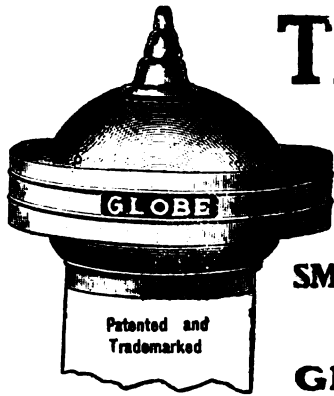
ber of foreign exhibits recorded in the catalogue as it stands is therefore 6,449. Adding this to the number of the American exhibits, we have a grand total of 9,983 works. The Russian section and the loan collection, which have yet to be added, will thus bring the figures above ten thousand. The four buildings which house these ten thousand works contain, in all, 154 galleries.—*Boston Transcript*.

**FIRE INSPECTION IN MASSACHUSETTS.**—As the new law in Massachusetts abolishes the old fire-marshal's department, fire inspectors of the District Police have taken their place. The entire criminal business of the State will now be conducted by the detective department, the work of investigating incendiarism being delegated to the fire inspectors. They will also receive the co-operation of the detective force, when necessary. This will add materially to the efficiency of the work of procuring evidence, and prosecuting incendiaries, as a much larger force will be available for this branch of the work than was formerly the case.—*Fire and Water Engineering*.

**A KING TURNED INN-KEEPER.**—The King is the first restaurateur of his kingdom. He owns one of the leading hotels, a cafe and the best two restaurants at Stuttgart, one, the Marquardt, being situated opposite the royal palace, while the other bears the name of the Riesig, and is located under the arcades of the Konigsbau. In running these establishments as a source of profit to his private exchequer the King is merely continuing the tradition of his predecessors on the throne, and I recall an odd story as far back as the times of Peter the Great in connection with this peculiar source of royal income. It seems that the Czar, who was determined on retaining his incognito in traveling through Europe, absolutely declined to take up his quarters at the royal palace at Stuttgart, but insisted on going to an inn. Having learned of this prior to his arrival, the Wurtemberg sovereign caused all the hotel and inn-keepers to remove their signs. Over the principal doorway of his palace he had a huge sign hung out, stating that within there was cheer for man and beast at cheap prices, and that the name of the hotel was the Konigsbau. On the Czar's carriage and retinue entering the city, the postillions, previously instructed by the Wurtemberg officials, drove straight to the palace, and there, standing at the main entrance, was the sovereign, fat and burly, arrayed in the traditional costume of a boniface, with white apron and cap, etc., while the various princesses, princes, nobles and dignitaries of his court were costumed as waiters and waitresses, hostlers and other servants. Peter the Great, greatly amused by this witty and kindly manner of humoring his wishes, entered thoroughly into the spirit of the joke, which was kept up until the following day, when he proceeded on his journey.—*Marquise de Fontenoy in N. Y. Tribune*.

**DOMINICA'S BOILING LAKE.**—The *Dominican*, published at Roseau, Dominica, has printed a paper by Mr. F. Stearns-Fadelle on the boiling lake of that island. It was unknown until 1875, when a gentleman who had lost his way in the forest approached the lake near enough to be aware that he was in the neighborhood of a centre of subterranean ebullitions. His report led a party to go in search of it. The search was rewarded by the discovery of the lake, which is elliptical in form, about 200 by 100 feet in measurement, and stands 2,425 feet above sea level, in the midst of a volcanic area some five square miles in extent. When fullest it drains into the Pointe Mulatre stream. At times it is quiescent, and then it may be ebullient for days at a time. It has not yet been ascertained whether ebullition occurs at definite periods. Vertical cliffs of ferruginous soil and rock rise from the water, and in sounding ten feet from the edge of the lake no bottom was found at a depth of 195 feet. Sulphuretted hydrogen is exhaled at intervals, and the gas proved fatal to a visitor and guide in 1901; while other visitors have suffered from its effect. When the water is quiescent it is still a lake, showing that this is not merely the outer part of a subterranean funnel. The volcanic region in which it is situated is called Grande Soufriere.

**THE RIGHT TO BUILD A DOVECOT.**—It is not universally known that the right of erecting a dovecot was a privilege only to be enjoyed in England by the lords of the manor, and the law was vigorously enforced on this point. But in Scotland, according to a statute still held in observance, nobody has a right to build a cot in either town or country unless he is the owner of land yielding about 960 imperial bushels of produce per annum, and this property must be situated within at least two miles of the dovecot, or pigeon house. A further enactment also states that on the above-named conditions only one cot shall be built. A distinguished authority on husbandry estimated that in 1628 there were 26,000 dovecots in England, and that allowing 500 pairs to each house the damage wrought by birds in devouring corn would work out at no less than 13,000,000 bushels, that is, an allowance of four bushels yearly to each pair. Any one who destroyed the cot was guilty of theft and is so held at the present time in Scotland (the act was passed in 1579), while a third offence or dovecot breaking was capital punishment.—*The Hour Glass*.



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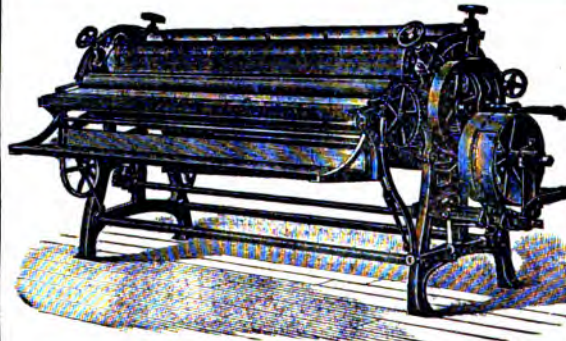
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NO. 1493

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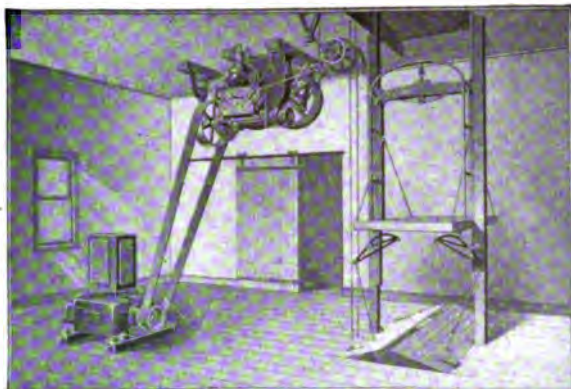
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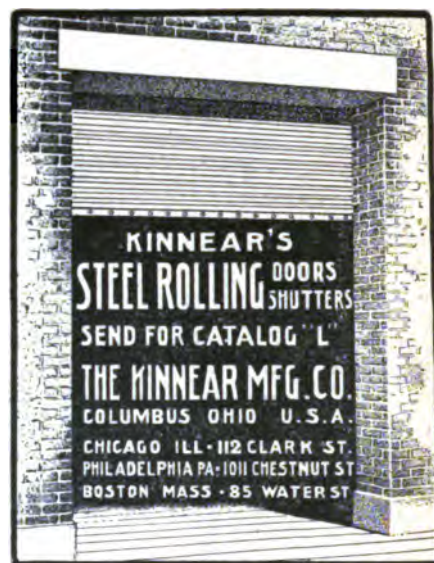
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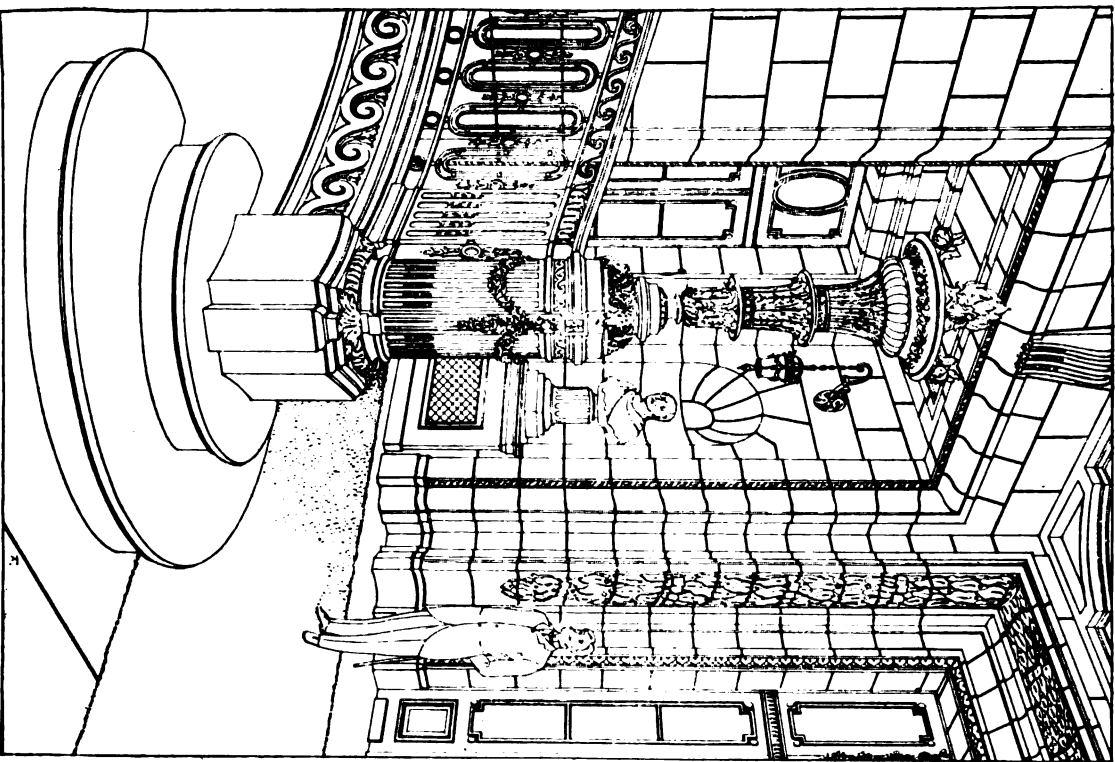


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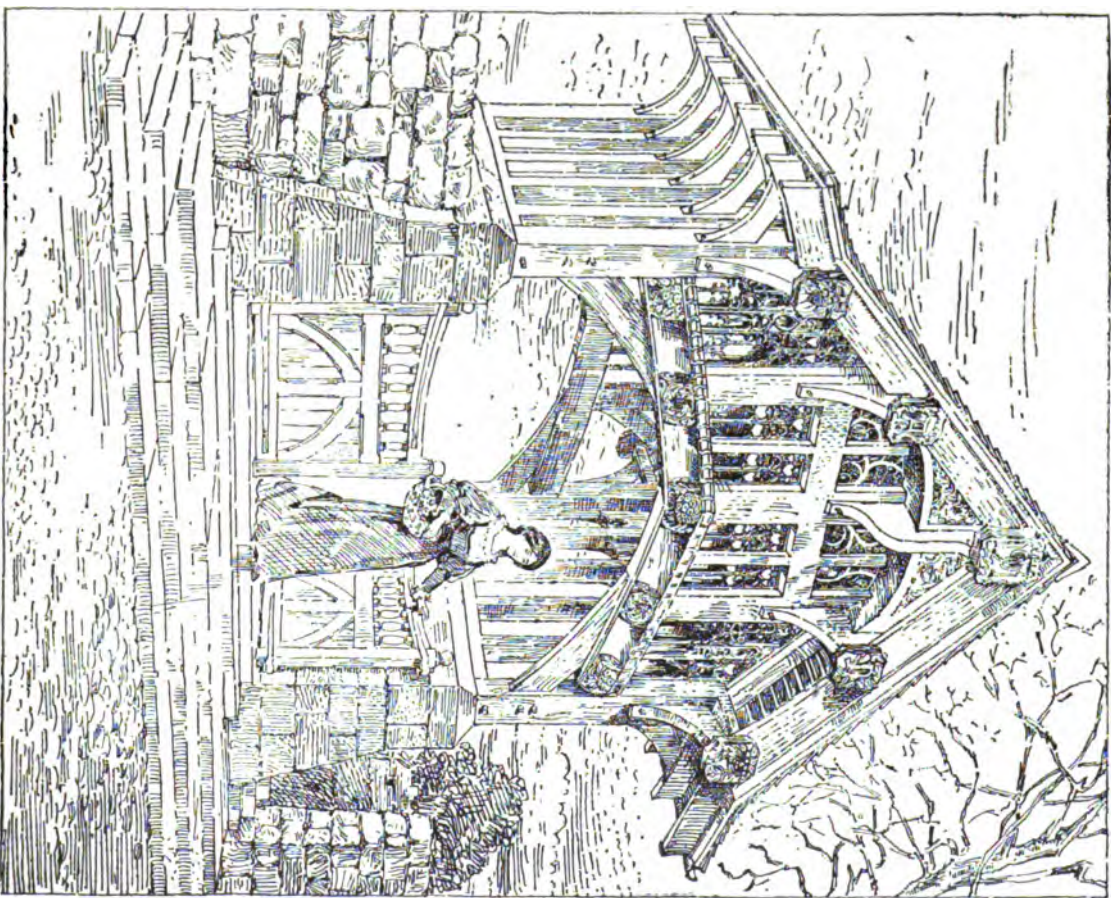
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# THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. LXXXV

SATURDAY, AUGUST 6, 1904

No. 1493



## SUMMARY:—

Is our National Fire-loss an acceptable as well as accepted Evil.

— Public and Semi-public Buildings most properly subject

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The Secretary of the Treasury and the St. Louis Fair.

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THREE hundred million dollars' worth of buildings and their contents is, of course, altogether too much property for economical people to burn up in the course of a twelvemonth, and yet that appears to be the cost that we Americans are paying because we have been so long habituated to employing faulty methods of building construction and heedless practices in the conduct of our daily occupations and the care of our buildings. But our social system is adjusted so as to distribute the burden of the vast loss indirectly upon the public at large, and, more than this, it not only expects to meet these annual losses but one may almost assert truthfully it desires to have them. It would be a very serious matter to many people, if these annual fire-losses did not occur for a series of years. The first year in which no fire occurred there would be general jubilation, the fire-engine crews would welcome the rest and relish the return to unbroken nights' rest, and stockholders in insurance companies would be happy in their increased dividends. But in the second fireless year a good many business men would wonder what was the matter with their accounts, and building mechanics would find there was so little work to do anywhere that they must, perforce, forego the joys of continual strikes, while in the third year, unless human nature should change greatly, there would be a widespread outbreak of incendiary fires as a first step to restoring the building industries to their normal condition. It is fortunate, therefore, that the progress in replacing combustible with incombustible buildings is and must be slow, so that the working classes and those who purvey for them can gradually adjust themselves and their affairs to meet the changed conditions.

BUT as things are adjusted now, though very crudely, it is questionable whether the fire-loss is an unmixed evil. A recent report of the Insurance Engineering Experiment Station shows that during the last three years alone there were destroyed or in-

jured by fire very nearly ninety-five hundred public or semi-public buildings, such as theatres, schoolhouses, churches, hospitals, jails, hotels, etc. If we assume twenty thousand dollars as the average loss in each case, we find that the loss on buildings of this class accounts for practically one-fifth of the total annual loss, and this in turn suggests that, as these buildings are of a public or semi-public nature, the public has a better right to put compulsion on the owners in the matter of their fireproof building than it has to compel a private individual to build a fireproof house or shop for himself, and hence such compulsion could fairly be ordained by a general law. This would be all the more reasonable seeing that in the case of some of these buildings, as jails, hospitals, asylums and schoolhouses, they are not only inhabited, but their human occupants are there largely by virtue of the compulsion of the public, and are under such physical restraint as to make their efforts at self-preservation in case of fire almost certainly abortive.

THE young people of to-day know little of the aridity of the artistic furnishing of the houses of even the well-to-do in this country just before the Civil War. The slippery horse-hair-covered furniture had just given place to the lugubrious black walnut work in bulbous forms; carpets stared at you with wonderful presentations of plant life and wall-papers did equal violence to botanical truth; mezzotint engravings of Landseer's and Millais's pictures were the fashion, and those who could not afford to buy these novelties still left in place their "Washington crossing the Delaware" or their "Franklin at the Court of Louis XVI." In sculpture it was the day of the heroic ancestral plaster bust or the parian statuette, distorted in baking; some had advanced enough beyond Puritanical notions to feel they dared have a cast of the Venus of Milo, though they could not bring themselves to give house room to the Venus de Medici. It was into many houses thus bare of artistic equipment that a first lesson in art was brought in the shape of a statuette by John Rogers, who died last week at the age of seventy-five, and we believe he could rightfully claim to have done more to help the people of this country to discover that they did have an instinctive love of art than any man of his generation. The vogue of these statuettes was immense, and at one time Mr. Rogers must have had a very satisfactory income from the groups he published. People were not educated to the appreciation of sculpture of high merit, and there was little of it to be had. If the generality of people knew of Powers's "Greek Slave"—a notable figure in its day—they spoke of it in whispers and, if they had a chance, looked at it shyly. But people could appreciate and enjoy, because they understood, these groups of Rogers's, each of which told its story intelligently and artistically, because truthfully, and through this understanding were led on to enjoy and appreciate sculpture of really a higher worth. Coming out as these groups did with a considerable frequency during

the war, and dealing to a great extent with army incidents, pathetic, exciting or amusing, these groups because of their subject and their truthfulness became part and parcel of the great patriotic impulse that possessed the North at that time, a universal passion that men of the present day cannot understand. Many, perhaps most, of these groups of Rogers's—nearly fifty in all—were cast in bronze as well as in plaster. In his larger work the sculptor was not very successful; his equestrian statue of General Reynolds in front of the Philadelphia City-hall being distinctly a failure.

IT seems a little unkind that the Secretary of the Treasury should insist that the managers of the St. Louis Fair should live up to their engagements and pay back at the stated times and in the agreed way the money loaned them from the United States Treasury. We do not know that government loans made to earlier international fairs were never repaid at all, but we are quite certain that in these earlier cases the government was a very lenient and considerate creditor. It would be an outcome devoutly to be wished, if the result of this exaction of the "pound of flesh" should be to put an end to granting Federal assistance to these undertakings, each one of which is devised for selfish purposes by professional promoters of such exhibitions. These vast undertakings are always accompanied with a considerable financial wreckage which need not have been encountered, and they are unsettling and consequently disadvantageous to the community in which they are held. If the local labor market could handle the matter the result might be favorable, but exhibition building is now so vast an affair that the work can only be accomplished by calling in largely outside help, which results in a glutting and subsequent disorganization of the labor market which lasts for years. Paris has found its exhibition periodicity of eleven years hardly long enough, while we, after our usual fashion of overdoing, have crowded into such a period the elaborate fairs at Chicago, Omaha, San Francisco, Buffalo, Charleston and St. Louis. The people are surfeited and are no longer willing to endure the cost and discomfort of sight-seeing, and so, since the government insists on being paid in full, no matter who has to go unpaid, it is more than likely that the St. Louis fair will show a larger deficit than usual.

CHICAGO has set afoot a very admirable undertaking which deserves imitation. New York, following the example of European cities, is furnishing for its poorer citizens an admirable series of recreation piers and public baths in different quarters of the city, and in Boston, too, we have some public baths and some of our public schools have bathing facilities provided; moreover, in connection with our park system, there are at South Boston and at Revere Beach a variety of buildings—bath-houses, restaurants, and so on—which the public can use whenever the public sees fit to take a jaunt in that direction. The Chicago undertaking, however, promises to go farther than this in the attempt to make the life of its poorer citizens not only cleaner but more enjoyable in an innocent way. Taking advantage of its large superficial area, the city has laid out its park system so as to bring a park of reasonable size into close juxtaposition with different centres of habitation, and fourteen of these small parks

are now being laid out, and it is proposed to furnish each of them with a public building, costing upwards of sixty thousand dollars, to which the people can resort as to a club-house. Besides a general assembly-room and smaller club-rooms to be used for games, smoking or conversation, there will be a simple gymnasium, bath-rooms—in some of the larger buildings even a swimming-tank—and a refreshment counter. Considering how great a hot-bed of labor discontent Chicago is and remembering how heterogeneous is its population, many of its alien citizens being accustomed to congregate in public places when the day's work is done, it seems to us that this providing a place where they can observe their national habit in quiet enjoyment is well worth copying by other cities.

THE Province of Quebec Association of Architects has effected a change in the matter of scholarships in architecture. Ordinarily, such scholarships have been founded in order that the successive holders might add to their professional equipment whatever of good they might be able to derive from a time of travel and study in Europe during the term of one or two years. These scholarships, whether founded by individuals, clubs or schools of architecture, generally come as the crowning grace of a prolonged period of educational effort, and they afford a welcome opportunity for correcting, assimilating and clarifying views and impressions that have been but imperfectly comprehended in the earlier stages of immature effort. The Quebec architects apparently feel that aid given in these earlier stages may be as welcome and perhaps as valuable as that which is offered later; they therefore have founded a scholarship which guarantees to the winner a four years' course of study for the degree of Bachelor of Architecture at McGill University in Montreal. The scholarship is open to the competition of natives of Canada who have been employed in the office of any member of the Association, provided they have passed the Association's preliminary examination and the University's entrance examination. The winner of the scholarship should be a youth worth helping, if proof is to be found in the winning of a competition and the passing of two examinations.

HOWEVER much one may be inclined to question the credibility of the theories which Professor William H. Goodyear has propounded, with supporting pictorial evidence of much value, with reference to the symmetry and assymetry of mediæval architectural design, no one can question the thoroughness of his investigations and the earnestness and self-sacrifice with which he has pursued them. There are numberless other patient investigators pursuing their work, sometimes useful and at others seemingly useless, of whom the world never hears, and largely because their investigations do not lend themselves to pictorial illustration and proof—and this is the age of instruction through the eye, as was never the case before in the world's history. These other patient workers will probably find as much pleasure as we do in learning that the Associazione Artistica Fra i Cultori di Architettura, of Rome, has made Professor Goodyear an Honorary Member of its honorable body in recognition of the value to architectural history of the investigations he has laboriously carried on.



THE CLOUD OVER ENGLISH LIFE.<sup>1</sup>

FOR many years past the question of the smoke nuisance has excited from time to time a rather too languid interest amongst various classes in England. Probably were the evils connected with it more generally understood, the necessity of grappling with the difficulty would be fully appreciated. In a general sense I may sum up these bad influences as follows:

1. Wastefulness, thereby entailing unnecessary outlay.
2. Injury to the national health, thereby inducing physical deterioration.
3. Injury to our agricultural industry, thereby favoring food importation.
4. Interference with the comfort and beauty of social life by creating dirt, injuring property, and entailing much extra work.

Thus the indictment against the present system of coal consumption is a very heavy one; but when science, which is now doing so much to make the wheels of life run more smoothly, offers her assistance, is it wise for us to reject it? The innate dislike to change evinced by Englishmen even of the educated classes is in some respects a rather unfortunate characteristic. We are apt to bear with a long-standing abuse until it becomes intolerable: it is only then we look for a remedy, and consequently, in some directions, our national movements are slow. The smoke nuisance has now reached a pitch which urgently demands a remedy, and the more so because the attendant evils, if not checked, bid fair to become much more serious. In the following pages I aim at placing the precise nature of those evils and their extent before the reader.

It has been calculated that in the case of the ordinary domestic grate at least four-fifths of the heat goes up the chimney, and is therefore wasted fuel. According to this a householder purchases, say, five hundredweight of coal for cooking, heating purposes, etc., but he only gains the heating power of one hundredweight; he pays for the balance, but receives absolutely nothing for his money. At the same time he and his neighbors incur a very palpable injury, as will be seen later on, from the pollution of the atmosphere.

The extra expense representing outlay without benefit or reproduction figures as a large item in the expenditure of masses of people who have very small incomes, but to whom coal consumption is a matter of daily necessity. The householder individually is a direct sufferer, but, in addition to this, it is clear that we are annually wasting a vast amount of a most valuable national product of which we have only a limited but rapidly diminishing quantity in reserve. Yet it is on this very product that our national supremacy largely depends.

In every thousand pounds of coal there are, on an average, about eight pounds of sulphur, and when the coal is burned this escapes into the atmosphere as sulphurous acid. A portion of this sulphurous acid combines with the oxygen of the air, and then forms sulphuric acid (oil of vitriol), which falls to the ground, and is always destructive to vegetation or living tissues of any kind, in proportion to the quantity present. The air we breathe is, therefore, according to locality, more or less charged with sulphuric acid, which, always injurious to the general health, is most pernicious in cases of lung complaint. Mr. Estcourt, the city analyst of Manchester, as quoted by Mr. Wm. Thompson, states that out of every hundred tons of coal burned in the factories of Manchester, one ton remains in the air as soot from black smoke.<sup>2</sup> Chest affections are naturally much aggravated by this, especially as soot is not by any means simple carbon, but is laden with the acids formed by combustion. Not only our factory towns themselves but large adjacent areas are subject to this noxious influence. It may be said that over the whole of Staffordshire, Cheshire, and large portions of Derbyshire, Yorkshire, Lancashire, Leicestershire, Warwickshire, and Nottinghamshire, a great pall of smoke hangs, vitiating the atmosphere, and partially obscuring the sun's rays. In London the inhabitants while resident there never breathe really pure air; and for many miles around, according to direction of the wind, the noxious influence is felt. The fact that the air is continually charged with a superabundance of coal-smoke is undoubtedly one of the causes owing to which life in London is rarely, if ever, perpetuated beyond the third generation, unless reinforced by fresh blood from the country.<sup>3</sup>

For several years past the alarming increase of cancer in proportion to the population has occasioned natural anxiety and stimulated scientific research into the causes of the dire complaint, some medical opinion seeming to consider it of *fungoid growth*. It is also a scientific fact that fungoid growths are nourished by carbon, and coal-smoke is unconsumed carbon mingled with other unwholesome gases. There is a special complaint known as sweep's cancer, produced by contact of soot with the skin, and soot is unconsumed carbon in a more condensed form than as smoke. The air we breathe night and day is charged, sometimes heavily charged, with this unconsumed carbon, which has been proved to be productive of cancer when there may be a predisposition to it. Indeed, I have seen in a medical work a case cited of a gardener who contracted the complaint in his right hand from continually scattering soot on flower-beds. The above facts are surely somewhat suggestive of the increase of the malady being associated with the increase of coal smoke, though of course there may be various other contributory causes.

Dr. Leigh, formerly Medical Officer for Manchester, in a report to the Corporation of that city, stated that, with much more which was detrimental, ordinary coal-smoke contained, as gaseous constituents, carbonic oxide, carburetted hydrogen, and sulphuretted hydrogen. These are all more or less deadly, they are the results of imperfect combustion, and therefore their existence in the atmosphere is wholly unnecessary. It is also a fact that *post-mortem* examination on persons who have lived for long periods in our large towns shows considerable accumulation of black matter in the bronchial glands and lungs. In some cases this foreign matter causes a lesion of the lung itself. In the same report Dr. Leigh presents some very conclusive statistics as to the difference between the numbers of deaths owing to complaints of the respiratory organs in localities when the air was charged with coal-smoke, and when it was comparatively free from it. In Cheshire and Lancashire, where volumes of sulphurous acid and other properties from factory chimneys poison the air, the deaths from complaints of the above nature were 4,381 per million of the inhabitants, and for London 4,365; but for Sussex, Hants, Berks, and parts of Surrey and Kent, 2,835. Perhaps enough proof has been given, though more could be adduced, to demonstrate the ill effects of coal-smoke on health, but ample medical testimony is forthcoming to prove that the poisonous gases which the town inhabitants are continually breathing lower the nervous system, and the irritant gases excite disease of the respiratory organs. In fact, it is easy to realize the difference of hygienic conditions between those living in a smoke-covered town and in healthy country air by comparing the stunted, pale-faced factory population, and especially the flabby unwholesome children, with the stalwart fresh-complexioned inhabitants of an agricultural district.

Probably the evils springing from living in a dense smoke-laden atmosphere are not confined to mere physical deterioration. In Switzerland cretinism, in different degrees varying from feeble-mindedness to absolute and hopeless idiocy, is so common that from time to time searching inquiries have been made to ascertain the cause of its prevalence. The result of the investigation shows that cretinism exists in the mountain regions of Switzerland and Italy, also in the Pyrenees and the Himalayas, but it is always more prevalent in valleys surrounded by steep walls of rock, which exclude the light and prevent the free circulation of air. In Switzerland especially there are certain deep narrow valleys which are only exposed to the sun's rays for a few hours in the day, and it is these which produce the largest number of feeble-minded children. Experience amply proves that animal life suffers from want of the healthy, vivifying influence of sunshine, and by a parity of reasoning it is evident that in proportion as a dense pall of smoke intercepts the sun's rays, mischief as to mentality and physical development in some degree must ensue. It is calculated that in England and Wales there are about 42,000 feeble-minded children, and Mr. Dickinson, D. L., L. C. C., states that the number of these of all ages whose minds are not strong enough to enable them to take care of themselves would be about 100,000.<sup>4</sup> The causes for such a deplorable state of things are various, being naturally due to unhealthy conditions of some kind, but amongst them must be reckoned the continual breathing of a vitiated atmosphere and the deprivation to a large extent of health-inspiring sunlight.

In London alone there are in round numbers 600,000 inhabited

<sup>1</sup> Portion of a paper by Mr. Charles Rolleston in the *Westminster Review* for July.

<sup>2</sup> "Some Common Sources of Air Pollution." By William Thompson, F. R. S.

<sup>3</sup> "Life and Labor of People of London." By Charles Booth. 1st Series. Vol. III, p. 65.

<sup>4</sup> "The Treatment of the Feeble-Minded." A paper read by him at the Central Poor-Law Conference held at the Guildhall, March 11, 1903.

houses; consequently the output of coal-smoke from domestic chimneys alone must be enormous, and Sir William Richmond<sup>1</sup> states that the cost therefrom to the metropolis must be about £4,000,000 annually. He also calculates that during the winter months London must lose about 50 per cent. of the sunlight which, so necessary to health, is enjoyed by those living in the country. As this gentleman truly remarks, "The injuries to health and property resulting from the excessive emission of coal-smoke are so numerous and apparent that it is difficult to account for the indifference displayed by the public in general in so vital a question."

As population is augmenting rapidly in England, the number of houses, and consequently of chimneys, must be increasing in about like proportion. The injurious effects on vegetation, however, of so much coal-smoke being spread over the land, though very great, has never been realized to its full extent. The injury springs from two causes, viz., the partial interception of the sun's heat and light rays which are required to vivify the growing plant, and the noxious gases which tend to poison it. In a pamphlet published by Mr. Holland on air pollution,<sup>2</sup> he gives it as his opinion that the air of the whole of England is polluted to a degree perhaps imperceptible to our senses, but sufficient to prevent trees from ever again attaining the dimensions they reached in former times. When forest trees suffer as they do, it follows that growing crops must be easily affected by masses of sulphurous acid in the atmosphere, together with the chemical result as sulphuric acid, which, according to the quantity impregnating the soil, kills or injures vegetation. That this is so requires no further proof beyond the fact that ground in the vicinity of several factory towns, having become valueless for agricultural purposes, has gone out of cultivation.<sup>3</sup>

Crops, trees, and flowers are injured, bees cannot exist, and a zone appears where even the grass will not grow.<sup>4</sup>

From Mr. Holland's pamphlet I quote the following, as indicating the noxious influence which must dominate a large portion of our country:

"Some years ago I had the honor of making an inspection of all the public parks of Manchester on behalf of the Corporation, and I furnished several reports of their then condition to the Parks Committee. I need scarcely say that, going as I did from the fresh green country, I was horrified to see the havoc that was being made. Fine open spaces—some of them nicely diversified with hills and valleys which ought to have been beautiful, and would have even been picturesque if well covered with trees, and which should have supplied pleasant recreation grounds for a population that sees far too little of country life and breathes far too little of fresh country air—rendered hideous by the blackness of everything with them—trees stunted, dying, flowers struggling to bloom and sometimes their species scarcely recognizable. It is no exaggeration; and as long as the surrounding chimneys send out volumes of sulphurous acid and of carbon there can be no improvement. There are certain chemical works in the neighborhood of some of these parks which send out other poisonous gases; but the gardens and parks in and around Manchester, I am convinced, suffer much more from coal-smoke than they do from any other pollution. In fact, 'the smoke nuisance' extends over a great part of Lancashire and Yorkshire, totally irrespective of chemical works, which are, for the most part, gathered into centres."

The enormous area affected by the smoke of a factory city may be, to a small extent, gauged by the fact that at Lockinge in Berkshire, when the wind has been in the southeast, dense clouds of smoke have been observed rolling over the downs and traveling on towards the north; carrying with them that well-known, peculiar, stuffy London smell. Now, Lockinge is sixty-four miles from London, and who can say how many miles farther those clouds proceeded in their course? The natives there speak of this as "London dirt," and say that in winter time it leaves its black traces on the snow. It is calculated that one factory shaft emits more smoke than two hundred small chimneys, so surely it is safe to say that half the London smoke comes from these, if we add what is produced by steamers, locomotives, electric-lighting stations and places of amusement, and all these, under the Public Health Act, are liable to prosecution if they create a nuisance.

It is said that the atmosphere of London contains six thousand tons of unconsumed coal daily, and still we mourn the ever-growing scarcity of coal!

It is not only in the perpetual waste of fuel that the nation suffers. Coal-smoke injures ceilings, hangings, curtains, carpets, wall-papers, pictures, gilding, clothes, and furniture; so washing, cleansing and constant renewing must be looked on as the alternatives to a most palpable general aspect of griminess and dirt. Coal-smoke attacks metal work, it corrodes the stonework of our public buildings; orchards and flower gardens suffer according to their proximity to a factory town. The evil does not even stop there. Many kinds of the prettiest and most artistic work in bright colors, as furniture, decorations, or clothes, cannot be used in our large towns unless the owners reconcile themselves to the articles being destroyed in a very short time, and therefore they are out of the reach of the majority who have limited incomes. The town householder, in furnishing and decorating his residence, must always count on the defacing and destructive influence of the smoke-laden atmosphere, and therefore, if he desires to avoid ever-recurring expense, must limit himself to certain materials and sombre colors. It can readily be seen from this that many branches of industry which would tend to beautify the home and heighten the artistic sense must be considerably checked.

It is indeed seldom that any movement, though aiming at the most palpable benefit for the community, has achieved its purpose without noisy, often strenuous, opposition. In the case of the smoke-abatement nuisance there exists an obstructionist party who say that coal-smoke is a disinfectant, and that, without it, infectious diseases *might* be more prevalent than they are. This is, however, a mere surmise, and I imagine research would show it to be based on a fallacy. For instance, are infectious diseases more prevalent, in proportion to the population, in districts free from smoke than they are in cities and towns? I have never seen the slightest proof of this; were it the case, statistics would have settled the question long ago, and in fact whatever evidence there is on the subject bears distinctly the other way. In the late Dr. Angus Smith's twelfth and thirteenth Alkali Acts Reports, he says:

"I think it was sufficiently shown in one of my reports that the cases of scarlet fever were not diminished by the acids at Widnes. The amount of acid required to disinfect the air, so as to remove that disease, if any amount could remove it, would be very great indeed; and Dr. Spiers has since shown that other zymotic diseases are not driven out by alkali works on the Tyne."

In face of the many admitted serious and increasing evils springing from the volumes of coal-smoke which taint our atmosphere, the questions arise, are any means available to deal with the growing nuisance, which are the most applicable, and what is being done in this direction? An agitation which had been simmering for a considerable time past took definite form about four years ago by the establishment of the Coal Smoke Abatement Society, under the auspices, I believe, of Sir William Richmond. This gentleman has become its president, assisted by a strong board of vice-presidents and a council, whose names alone are a sufficient assurance as to the *bona fides* of the scheme. The society seems to be well and economically worked; its immediate objects being, by means of a staff of inspectors, to ascertain where and how infringements of the law relating to non-consumption of smoke exist, and to set the law in motion.

The causes of the smoke nuisance may be divided into two classes. The first is produced by the factories, steamers, locomotives, etc., before mentioned; the second, by the fires from private houses. The society occupies itself with the first, as it is alone subject to the law, and during its short term of existence much good has been achieved. Its efforts have, however, been greatly hindered by the fact that, in spite of its undoubted beneficial action, subscriptions have come in very sparingly. The society and its objects are known to comparatively few, it has not yet aroused the widespread interest it deserves, and it has met in many cases with but faint support from the local authorities. To substitute a smoke-consuming apparatus for the ordinary furnace would doubtless entail a certain expense, though in the long run the public would gain enormously; so the individual factory owner infringing the law takes chance of being prosecuted, and finds it cheaper to pay the fine than incur the *initial* expense of the smoke-consuming contrivance. Ultimately the factory owner gains considerably in economy of fuel and labor. Even when a

<sup>1</sup> President of the Coal-Smoke Abatement Society.

<sup>2</sup> "Air Pollution as affecting Plant Life." By Robert Holland, Esq., M. R. A. C., Consulting Botanist to the Royal Manchester, Liverpool, and North Lancashire Agricultural Society.

<sup>3</sup> "Air Pollution as affecting Plant Life."

<sup>4</sup> "Air Pollution: A Piece of Coal and What Becomes of It." By George E. Davis, F. I. C.

conviction is obtained, the magistrates generally impose merely nominal fines, which are paid at once, and the abuse goes on.

### SMOKE PREVENTION.<sup>1</sup>

I DO not wish to appear as an advocate of smoky chimneys, since I prefer clean linen and a clear sky. At the same time, I should like to try to add a little to our knowledge of the subject since it is only by accurate facts and clear thinking that we shall ever reach any improvement, and before taking up the logical development of the question I should like to tell of the result of one small branch of the investigation, viz., the value of automatic stokers, since this illustrates the errors which we may easily fall into. My first knowledge of these came from the promoters of the various types, all patented of course, though Watt designed and built many in the century before the last, and there has been a new crop every decade since. Now, all these promoters had authentic tests of their devices made in comparison with hand-firing that showed a saving of from 10 per cent up to 35 per cent or 40 per cent, and the average saving was at least 15 per cent. Fifteen per cent saving in the coal bill will pay a tremendous return on the cost of installation of any mechanical stoker, and it seemed, therefore, that boiler owners were losing a chance to make a very good investment. Before long, however, I began to run across instances of boiler owners who had tried stokers, and discarded them on account of various troubles, such as failure to work, etc. The promoters of that stoker always assured me that the discarded machine was one of their old types and that the machine which they were now building would give no trouble. Later, however, I found cases where the boiler owner reported a decided and often large saving of coal after discarding the stokers, or an increase in the coal bill after putting them in, and in my own practice I got results from testing hand-fired boilers far better than the average stoker test and as good as the best, though of course I also found stoker tests better than some hand-fired tests. That some of the stoker companies should then admit to me (privately, of course) that they had tests on file much to the disadvantage of stokers was no surprise.

I then began to make a collection of boiler tests, in which I made the rule that I would include no test that was specially selected in any way. Thus I refused any tests whatever supplied by any company interested in any patented device and omitted any published tests, even by the best authorities, if they were illustrative of any such device, since I felt sure that if the tests had not been favorable they would not have been published. I took, however, such groups as all the tests I had made myself, all the tests which some fellow-engineers were kind enough to supply me, with a statement that they were all the tests they had made, and the groups of tests made at various competitive exhibitions, the latter being mostly foreign. Even when the tests were selected in this way there was a possibility that tests unfavorable to some patented device had been suppressed, nevertheless it is better than including tests that have been specially selected to show the advantages of some particular type. The whole series is at least not unfair to the patented devices.

Now all these tests amounted to over one hundred, and on carefully comparing them the automatic stokers showed up less than 1 per cent better than hand-firing. The moral is obvious.

Another illustration of the loose methods in vogue by the advocates of smoke-prevention laws occurred a couple of years ago, when some estimable Boston reformers secured the services of a famous professor from one of the smoky Western cities to testify how easy it was to reduce and prevent any emission of smoke, and he so testified before a committee of the Massachusetts Legislature. However, on looking through the reports on smoke prevention in this and corresponding Western cities I found two of the chief methods which had been successful in preventing smoke to be, first, the use of smokeless coals such as Pocahontas and New River without any change of grate, or the use of a mechanical stoker which enabled the use of a very much cheaper grade of coal. Now, Pocahontas and New River coal may be comparatively smokeless compared to Western coals, but these are the coals chiefly used in Boston and are the grade of coals against which these Boston reformers were complaining. The use of mechanical stokers permitted, in the Western city, the use of a cheaper grade of fuel and consequently resulted in a decided saving in cost of fuel; but the difference depended on the fact that in the Western cities, "run of mine," as ordinarily used on hand-fired grates, is more expensive than slack coal, while in

Boston "run of mine" is the cheapest grade, and to get slack coal would involve a higher cost of coal rather than a less cost. The methods that were available in the West were therefore absolutely unavailable in Boston, and if the whole story had been known the case of the smoke-law advocates would hardly have been as strong as it appeared to be on the surface.

We will now consider the question of smoke, not alone in the light of the experiments made by the promoters of smoke-prevention devices, but in the light of well-known facts of engineering and chemistry. First of all, we may note that anthracite coal makes practically no smoke and that coke likewise makes no smoke. Unfortunately, in all except a few districts hard coal or coke is much more expensive than soft coal. These fortunate districts such, for instance, as New York City, can reduce the amount of smoke to a minimum and at the same time increase the cost of their steam and of all the products of steam, such as heat, light, and power, by but a very small amount. It has been said that New York owes its immunity from smoke to its very drastic law and not to the cheapness of hard coal, but when many plants on the other side of the river in Newark, Paterson, etc., where there is no such strict enforcement of a smoke law, burn hard coal by preference, it is clear that the use of hard coal in Manhattan is no great hardship and that it is impossible to say what would be the result if soft coal were 25 per cent instead of 5 per cent or so cheaper than hard coal. I venture to say that if the relative prices of coal in Manhattan should differ by the larger amount instead of by the smaller, the officials of the New York Board of Health would either have to relax very much in the enforcement of the law or else flee for their lives. In fact, when the coal strike sent up the price of hard coal in New York the Mayor suspended the smoke ordinance by proclamation.

When hard coal or coke can be used the problem is solved. If soft coal which contains hydrocarbons must be used, it is impossible to prevent the smoke nuisance entirely. Soft coal, it is true, can be burned so as to give no visible smoke at the chimney-top, and it is likewise true that an oil lamp or gas jet can be burned so as to give no apparent smoke. Nevertheless, those who use electric light know how much cleaner their walls and ceilings remain than when they used gas or oil, while the discolored ceilings over a gas jet or oil lamp show where the soot comes from. I have had instances, in my practice, of serious complaint from soot in the neighborhood of a soft-coal furnace, though even the complainants admitted that practically no visible smoke came out of the chimney.

This leads us to one very important consideration, and that is the fact that it is the actual quantity or weight of soot discharged into the air that causes trouble, while it is always the appearance of the chimney top that causes complaint. For instance, consider a furnace that gave dense black smoke for ten minutes each morning and each afternoon, or say twenty minutes in each twenty-four hours or 1-72 of the time. If we compare such a chimney with one that gave only 1-10 as much smoke at any particular moment but gave steadily some light smoke, the latter would cause much less verbal complaint to the smoke inspectors, especially under such ordinances as are now on the statute books, but would really be giving about six times as much soot.

We may also compare a battery of boilers, each with its own chimney, as against the same boilers delivering into a common chimney. If a single one of these boilers smoked very badly and the others not at all, then with individual chimneys there would be much complaint, while with a single large chimney for the battery the top would show only a light smoke, which would cause but slight complaint, although the amount of soot would be the same.

Another point that should be carefully considered, but that is not always considered, is the question of central power-stations. The electric light and power companies are in large cities almost universally spoken of as the worst offenders against the smoke laws, but a brief consideration will show that we could afford to let them send forth almost any amount of smoke rather than put any serious burden on them. The choice whether a small factory or an office building shall put in its own plant to make its own light and power, or, on the other hand, buy electricity from the central station, is a close one, but the central station runs on a two pounds coal per horse-power, while the isolated plant seldom gets under six pounds per horse-power. Hence, for the same amount of soot given forth into the atmosphere, the central station should be allowed to make three times as much smoke.

Another point that is not often considered, in fact that cannot be considered, is that the amount of soot is not proportional to

<sup>1</sup> Extracts from a report by Mr. R. S. Hale, Engineer, issued by the Mutual Boiler Insurance Company, of Boston.

the color of the smoke. A small chimney attached to a boiler that is using but a small excess of air may show a dense black smoke. Change this over to a large chimney and let a large amount of air into the flue at the base of the chimney. Then the color of the smoke at the top will be much lighter, though the amount of soot may be the same as before. Supposing, for instance, that around a smoky chimney of 2 feet diameter we should build a shield 6-feet diameter, 15 feet high, open top and bottom. If the original chimney extended just above the roof, then this shield would look merely like a much larger chimney. The smoke from the small chimney inside would be so diluted with air by the time it could be seen by the neighbors that no complaint would be made, although the amount of soot would be the same as before. While such a shield has never yet been built, yet I have no doubt that much of the difference between some chimneys that cause complaint and others that do not is merely the difference in dilution by air leakage into the chimney and is not due to any difference in amount of soot discharged.

We thus see that different grades of coal from anthracite to very soft bituminous make different amounts of smoke, and that the apparent amount of smoke at the chimney top may differ without changing the real amount of soot. It is, however, also true that the same grade of coal from the same chimney may vary in the amount of soot it gives out according to various conditions of the combustion and boiler setting and furnace, and of methods of firing.

Coal, as we know, consists of carbon, hydrogen, sulphur, nitrogen, oxygen, and earthy matter, and these are chemically combined into various compounds. Combination with the oxygen of the air causes these to form  $\text{CO}_2$   $\text{CO}$   $\text{H}_2\text{O}$   $\text{SO}_2$  and certain nitrogenous compounds, all of which are colorless or practically colorless gases. Incomplete combustion gives soot which is composed of either pure carbon or of carbon-hydrogen compounds. Other hydrocarbons such as  $\text{C H}_4$  and the gases are colorless. Now, naphtha, kerosene, and, in fact, all the light oils and heavy oils formed when coal is distilled have a colorless vapor, hence are not soot, but as we get above the oils and into and beyond the compounds such as paraffine and towards the compounds with a very large proportion of carbon we find the soots. The question, therefore, is what are the conditions under which these sooty hydrocarbons are formed and burned or not burned in the furnace. The question of their formation need not bother us, for if they are not at first part of the coal, yet we know that when compounds such as paraffine and other constituents of coal are heated they "crack" according to the chemist's term and dissociate into the lighter colorless hydrocarbon gases and the heavier sooty residue.

These sooty hydrocarbons having been formed from the coal as it heats, the question is how to burn them. For this the requisite conditions are of course that oxygen shall be present, and that the temperature shall be high enough.

The question of mixture of the air with the hydrocarbons is seen to be very important when we figure the time allowed. A rate of combustion of 20 pounds coal per square foot per hour is not unusual. This makes roughly about 20 pounds gas per pound coal, or 400 pounds gas. At ordinary temperatures, say 60 F. or 500 absolute, this makes about 13 cubic feet per pound, while at combustion temperature of, say 2000 C., this is about 100 feet per pound of gas, making a total of 40,000 cubic feet per square foot per hour, or 11 feet per second. In some forms of water-tube boiler the gases have but three feet or so of travel before they enter the tube nest, or the time for mixture and ignition is but one-third of a second. By providing a large combustion chamber, as may be done, for instance, in a horizontal tubular boiler, this length of time may easily be increased four times. It is impossible to do more than estimate this average time. In a horizontal tubular boiler, for instance, some of the gases undoubtedly travel the whole length of the boiler. Others travel only the vertical distance from the grates to the shell, but if they then deflect they may mix with other gases hot enough to keep up the temperature to the proper point and have a longer time for ignition. It is only possible to make a rough comparison of different types of boiler and different types of setting, but we have an interesting case in some boilers, designed by Mr. E. D. Leavitt, which are under the charge of our company. There are two batteries side by side, the old battery set two feet above the grates, the new battery four feet. Otherwise, the boilers are practically duplicates, but the lessened smoke emission from the latter is very marked and is probably due to the larger combustion chamber. Of course, it must be remembered that this dif-

ference in setting increases the headroom required, increases the cost of setting and increases the annual repairs to the setting.

The advantages of a brick combustion chamber or brick arch in maintaining the temperature are very obvious. On the other hand, such construction, especially the arch construction, needs frequent repairs, and some designs of brick combustion chambers, such as checkerwork, check the draft and reduce the capacity and need frequent cleaning from ashes.

Another method of maintaining the temperature is the down-draft principle, whether in the Hawley type or in the underfeed stoker. These supply the coal where the fire is coolest instead of where the fire is hottest, and force the gases as distilled from coal when first heated to pass through the hot fire. The effect obviously must be good.

The cost of these is high both for installation and repairs, and it must be remembered that the apparent cost of repairs is not the only cost. Repairs involve laying off the boiler, and the fixed charges, such as interest and taxes, all go on whether the boiler is used or not; in addition to this, the use of any apparatus subject to repairs involves keeping extra plant ready in case of accident that may happen unexpectedly to a minor part and cause the laying off of the boiler. Any such apparatus further requires more supervision on the part of the superintendent or manager. A much larger proportion of the time of the superintendent will be found to be devoted to the power plant when any special apparatus is employed.

We will return to special devices for smoke prevention later, but will now consider the methods of firing.

Careful firing of only a small quantity at a time is an effective means of reducing smoke. If a large quantity of coal is fired at one time the hydrocarbons distill first and require an almost impossible amount of care to prevent smoke. As soon, however, as the coal is coked the smoke stops and no further attention is needed until further firing is required, when the same difficulty again appears. On the other hand, if one or two shovelfuls of coal are placed on a hot fire the temperature is usually enough to burn these hydrocarbons as they are formed, and if the firing is kept up steadily a little at a time, much less smoke is formed than if a larger quantity of coal is fired at once. It must be remembered, however, that this means very much harder work. It is nearly twice the work for a fireman to fire 15 shovelfuls of coal at two-minute intervals than to fire 17 shovelfuls at once and then rest half an hour. The actual work is much harder, so that more wages would have to be paid, and in addition there must be some sort of supervision to see that the method of firing is carried out. It would be impossible to get any man, even for double wages, who was both willing to do the extra work required by the one-shovelful method and trustworthy enough to have no supervision at all. Supervision in a large plant might not be very expensive, but in a small plant would be a serious tax, since a small fraction of the superintendent's time would cost as much as the whole wages of the fireman.

Mechanical stokers which feed the coal in a little at a time are of course nearly equivalent to the one-shovelful method. In large plants the saving in labor by the use of a mechanical stoker is often sufficient to pay the fixed charges and maintenance, and in such cases they may even reduce the total costs. In small plants there is no saving in labor, and the high fixed charges and maintenance make them an expensive luxury, even if they should be found to reduce the coal bill, and, as I have pointed out in the beginning of this article, the trend of the evidence of all except the stoker promoters is opposed to the idea that stokers save any coal. Further, while automatic stokers reduce the smoke they do not get rid of it entirely.

Steam jets which blow a mixture of steam and air above the fire undoubtedly reduce smoke, the action being probably just the same as ordinary air admission. They are effective because they are more fully under control than ordinary methods of air admission above the fire. They result, on the average, in a distinct loss of economy.

The considerations of the three factors of temperature, sufficient air, and sufficient time for mixture shows us at once why boilers working easily smoke less than when pushed. If a boiler is worked at half its rating the gases have twice the time to mix with the air supply above the fire before they strike the cooling surfaces, and, in addition, the same amount of soot per pound of coal makes but half the bad appearance at the chimney top.

From the above discussion it is seen that it will be perfectly possible to reduce the smoke nuisance either partially or absolutely. To prevent it absolutely requires only a law forbidding smoke emission, and this will practically force the use of hard



coal or coke. In certain districts, such as New York City, this involves very slight increase of cost to the boiler owner. In other districts it would mean a very great increase of cost.

Short of the use of hard coal or coke, smoke cannot be entirely prevented. In a manufacturing district dependent upon the production of cheap power for its very existence, it is probably unwise to put any limit on the production of smoke. Any such restriction will increase the costs of manufacturing, and the reformers, while they may reduce the smoke nuisance, will find they have checked the development of the very basis of existence of the town.

In districts partly residential, partly manufacturing, it is a question of judgment. Some restriction on smoke production is probably wise. Complete restriction is undoubtedly unwise, unless it is practicable to force the use of hard coal.

The question of the form of the law is a very difficult one. As has been shown, the amount of soot is the governing factor in causing annoyance, but this cannot be determined except by tests of the gases, collecting and weighing in a chemist's balance, and this is commercially impossible. In fact, it is found impracticable even in many expert boiler tests. Hence, the appearance of the chimney mouth must be used, though that is known to be subject to error, in showing the real harm done by the soot. The average appearance should be at least a factor, since a chimney that gives dense smoke for a few minutes a day, but is smokeless the rest of the time, is far less injurious than a chimney that continually gives forth light smoke. Absolute prohibition of even dense smoke is impracticable since it would be impossible to get a fireman so careful as not to make such smoke at times when firing for a sudden call for steam or when cleaning fires.

The following is suggested: The emission of dense smoke for more than fifteen minutes during the twenty-four hours to be forbidden.

Smoke to be divided into dense, medium, light, and none, counting say 3 for dense smoke, 2 for medium, 1 for light, and 0 for none, and an excess of over an average of  $1\frac{1}{2}$  during any ten hours to be forbidden. In cities using much soft coal of smoky varieties these limits might have to be increased, while in cities such as New York, where hard coal can be easily and cheaply obtained, they might be diminished.

The important question, however, lies in the administration of the law. It is absolutely impossible to draw up a smoke law that will operate itself or that can be trusted to unskilled hands. The question of smoke is, in fact, like our police laws. We have laws against drunkenness, but if every man who got drunk in his home or club or even on the street was arrested and fined, what a howl there would be! We have laws against betting and gambling, but if every man who bet a cigar or every church sociable that had a grab-bag were hauled into court, what would people say? The question of the enforcement of these laws is left to the discretion of the police, and the question of smoke abatement should be treated in much the same way. The law itself may be reasonably rigid; its enforcement must be reasonably lax. There should be no need for a separate smoke commission since the multiplication of departments with special offices, clerks, and other paraphernalia is unwise. The Board of Health, the Board of Public Works, the Street Department, or the Police Department itself are all suitable bodies to have charge of the enforcement of the smoke laws if the members are wise and intelligent.

There is one principle that has never to my knowledge been included in a law that is, I think, workable and suitable, and that is the placing of a tax on the use of soft coal. As we have seen, there is no possible way of getting rid of all the smoke and soot if soft coal is used at all, even if the chimney should appear absolutely smokeless. It would not be reasonable to forbid the use of soft coal absolutely except in very special cases nor to put a prohibitive tax on its use, but it would seem to be reasonable to say to coal users: "If you insist on using soft coal you must contribute to the public funds some, though not all, of the profit that you make by its use." In cities, for instance, where, after allowing for the different quantities of steam produced per ton of coal, soft coal is \$1 per ton cheaper than hard, it would be entirely reasonable to collect a tax of 25 cents per ton on semibituminous coal containing, say, between 7 per cent and 17 per cent of volatile hydrocarbons to total combustible, 50 cents per ton on coal containing between 17 per cent and 30 per cent, and 75 cents per ton on all coal containing over 30 per cent, or if these seemed too onerous, the tax could be made a graded one, 10, 20 and 30 cents. Such a tax could be easily collected when the coal entered the city either by rail or boat, with appropriate

provisions for coal that was merely in transit through the city. It would require but little analysis, as most coal would fall at once into one of the grades by mutual consent without any tests, and even when tests were required for the tax and were not required by the purchaser of the coal to make sure he was getting what he was paying for, the expense would be very light.

While such a tax would, I think, be highly successful, and while the average smoke emitted over a long period should be just as much considered as the number of minutes during which dense smoke is emitted, instead of only considering the latter, as is now the case with most smoke ordinances, yet it is on the personnel of the commission that has the enforcement of the law rather than on the law itself that successful results will depend. If the commission should devote itself to the encouragement of proper design of boilers and setting and to the installation of suitable capacity, then, if it does this wisely, it can do good without causing friction among coal users or greatly increasing their cost. Without such intelligent work, however, nothing can be accomplished in the line. For instance, in Boston there is a rule that no new boiler will be allowed unless its owner agrees to burn hard coal or to put in a smoke preventer. This is a good rule, but in its enforcement the officials care nothing about the form of smoke preventer and take no interest in the design of the boiler or of the setting, and as a result the provision is of but slight practical effect in smoke prevention, but does increase the costs to the boiler user.

The methods to be adopted by those who have enforcement of the laws cannot be laid down exactly, as they will require the exercise of great tact and discretion so as to obtain the best results with the least increase of cost to the users of coal. Some remarks, however, may prove of value.

In the first case, all new installations should be submitted to the commission or inspectors and influence should be used to get ample capacity, *i. e.*, ample grate surface and ample heating surface, as these are very important factors in reducing smoke. Influence should also be used towards providing an ample combustion chamber. Unfortunately, this latter requirement will lead to the discouragement of the use of certain patented forms of boilers, but this is unavoidable. The use of hard coal should be encouraged as far as possible.

The commission, still exercising its powers with tact and discretion, would, of course, discriminate between plants in the purely residential parts of a city and plants in the business or manufacturing portions, just as the board of police or license commissioners exercise a wise (or what should be a wise) discretion between granting liquor licenses in different portions of a city.

In dealing with existing plants the same principles would apply. A boiler user has no right to inflict soot and smoke on the city merely because he would like to get double the power out of his present boiler plant, unless he had the right originally when he put in his plant.

I think, therefore, that we may fairly conclude that the smoke and soot question is like the liquor evil, the social evil, and the gambling evil. We can seldom or never get rid of it entirely, but by a wise discretion we can diminish its evils.

This wise discretion lies in the hands of those who enforce the law, and those who desire the evils diminished should devote their attention to seeing that the enforcement is in the hands of wise, able and discreet men. Tampering with and amending the smoke laws will have no more effect than the various tinkering of the liquor laws have had in the past. In any districts where it is wise to put any restriction at all on the production of steam, almost any kind of a law may be put on the books provided its enforcement is in the hands of an able, honest and intelligent commission.

## ILLUSTRATIONS

[Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.]

THE FARRAGUT SCHOOLHOUSE, BOSTON, MASS. MESSRS. WHEELWRIGHT & HAVEN, ARCHITECTS, BOSTON, MASS.

SCULPTURE AT THE LAST SALON: "LE PENSEUR." M. AUGUSTE RODIN, SCULPTOR.

THIS and the following subjects are copied from *Art et Décoration*.

SCULPTURE AT THE LAST SALON: BAS-RELIEFS, BY MM. DALOU, DERRE AND DEBRIE.

NEWEL-POST IN A HOTEL AT NEUILLY-SUR-SEINE, FRANCE. R. BOUWENS VAN DE BOYEN, ARCHITECT.

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LYCH GATE, BRAMHAM, ENGLAND. MESSRS. BROMET & THORMAN, ARCHITECTS.

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ST. GILES'S MISSION CHURCH, GREAT WILD STREET, LONDON. MESSRS. ERNEST RUNTZ & FORD, ARCHITECTS.

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#### Additional Illustrations in the International Edition.

THE RAILROAD STATION, ZURICH, SWITZERLAND.

THE BATHS, SPA, BELGIUM.

CHARLECOTE HOUSE, WARWICKSHIRE, ENGLAND.

MONUMENT TO LOUIS XIV, NOTRE DAME, PARIS, FRANCE;—MONUMENT TO CARDINAL CARAFFA IN THE CATHEDRAL, NAPLES, ITALY.



**DURATION OF SOME ENGLISH MASONRY.**—In 700 years the stonework of three successive parish churches erected at Rowley Regis, Staffordshire, England, has perished, and it has now been found necessary to erect a fourth church.—*Exchange*.

**A SIX-THOUSAND-YEAR-OLD CYPRESS.**—The statement recently made that there are yews in England which are the oldest living things on this earth is not correct. These yews are old, very, very old; there is no doubt about that; some of them were stalwart trees even before Cæsar landed on those shores. There is one now standing in the churchyard at Fortingal, in Perthshire, which Decandole, nearly a century ago, proved to the satisfaction of botanists to be over twenty-five centuries old, and another at Hedsor, in Bucks, which is 3,240 years old. How Decandole arrived at an apparently correct estimate of the enormous age of these living trees is a simple thing, and the principle is doubtless well known to-day to all. The yew, like most other trees, adds one line, about the tenth of an inch, to its circumference each year. He proved this after an investigation extending over several years, and we know now, a hundred years later, that his deductions were correct. The old yew at Hedsor has a trunk twenty-seven feet in diameter, proving its great age, and it is in a flourishing, healthy condition now, like its brother at Fortingal. Their years are few, though, compared with those of the trees I had in mind when I made my first assertion that the statement printed about them in a scientific journal was incorrect. In one chapter of his writings Humboldt refers to a gigantic boabab tree in Central Africa as the "oldest organic monument" in the world. This tree has a trunk twenty-nine feet in diameter, and Adanson, by a series of careful measurements, demonstrated conclusively that it had lived for not less than 5,150 years. Still it is not the oldest organic monument in the world, as Humboldt declared, for now Mexican scientists have proved that a huge cypress tree, standing in Chapultepec, with a trunk 118 feet and 10 inches in circumference, is older than it—older, too, by more than a thousand years—for it has been shown, as conclusively as these things can be shown, that its age is about 6,260 years. To become impressed with wonder over this, one has only to dwell on that duration for a little while in thought. Yet it is not so remarkable when one stops for a moment to remember that, given favorable conditions for its growth and sustenance, the average tree will never die of old age—its death is merely an accident. Other younger and more vigorous trees may spring up near it, and perhaps rob its roots of their proper nourishment; insects may kill it, floods or winds may sweep it away, or its roots may come in contact with rock and become so gnarled and twisted because they have not room to expand in their growth, that they literally throttle the avenues of its sustenance; but these are accidents. If such things do not happen, a tree may live on for century after century, still robust, still flourishing, sheltering with its wide-spreading branches the men and women of age after age.—*St. Louis Globe-Democrat*.

**EFFICIENCY OF THE ELECTRIC CRANE.**—Hydraulic and electric cranes are working side by side at the Middlesborough dock of the Northeastern Railway of England, so that their relative advantages can be tested. According to the London *Electrician*, the traffic department finds the electric crane to be of great advantage. The controlling of the crane by one handle is a distinct

advance both over the steam and the hydraulic cranes. The automatic cut-off in the electric cranes interrupts the current in one case at three tons five hundredweight, and the other at ten tons ten hundredweight, and this device prevents an overload on the crane. Should the current fail at any time, the brake on the lifting gear is applied automatically, and will hold the full load in any position in safety. To obtain some definite idea of the speeds of the various cranes when working under ordinary conditions, they were tested separately. The steam crane had a load of two tons put on, and this was lifted 30 feet, carried transversely through 106.5 feet, lowered 30 feet; light hook lifted 30 feet, carried 106.5 feet, and lowered 30 feet. The total time for these operations was 1 minute 44 seconds, or at a rate of 34 cycles per hour. The hydraulic cranes, under precisely the same conditions, occupy 1 minute 40 seconds per cycle, or equivalent to 36 cycles per hour. The electric cranes did the same work in 64 seconds per cycle, or 56 cycles per hour, and this is capable of being increased beyond even this point with a good driver. Therefore, in ordinary working, electric cranes are doing 50 per cent. more work per hour than the hydraulic or steam cranes. On actual test it was found that the electric cranes can be released from the rails, moved 30 feet, and refixed to the rails in three minutes. When it was necessary to remove the hydraulic cranes, to suit the work into the various ships' holds, six men had to be called out one hour earlier in the morning to set the four cranes which are required for each vessel. With the electric cranes the men need not be called earlier, since two men in summer and four in winter can disconnect and connect up four cranes in fifteen minutes. In winter, on frosty nights, four men have been employed six hours each for keeping fires to prevent water in the cylinders of the hydraulic cranes from freezing; with electric cranes there is no need for this. When the steam crane has to be gotten ready for work, the driver has to commence one hour earlier in order to obtain steam, whereas the hydraulic and electric cranes are ready for work at any moment. The actual saving effected by electric cranes in the cost of handling cargo is 25 per cent.

**A SIMPLE PROOF THAT THE EARTH IS ROUND.**—Although it was demonstrated more than 2,000 years ago that the earth is globular in form, there are certain persons who maintain that it is flat. About thirty years ago a controversy on the subject waxed so hot that it was determined to put the matter to direct experiment in order to settle the question once for all. The place chosen was near Bedford, England, where there is a straight six-mile stretch of water. At both ends and in the middle of this water posts were erected, each of the same definite height above the water level. Upon looking with a telescope along the tops of these three posts it was clearly seen that the centre one overtopped the others by about six feet, owing to the curvature of the surface of the earth. These experiments were recently repeated in a more scientific manner by H. Yule Oldham, who read a paper on the subject before the Glasgow meeting of the British Association. The same results were obtained, with the important difference that by the employment of a tele-photographic lens and camera the six-foot prominence of the middle post was recorded in an unmistakable manner.—*Philadelphia Record*.

**LIGHTNING STRIKES A DYNAMITE MAGAZINE.**—Lightning struck the magazine of the Kelley's Island Lime and Transport Company, a Cleveland corporation, in Marblehead, near Sandusky, O., Saturday night, July 9, and about twenty-five tons of dynamite and 200 kegs of powder in the building exploded. Every building in the village was damaged, and about 100 persons were injured.—*Exchange*.

**A CASE OF LEGALIZED PREMATURE BURIAL.**—As there is a law against burying in the city of Albany, the Bishop had to have a special act of Legislature to be buried in the Cathedral. He was successful in having the act pass the law-makers, but his friends were astounded and worried when they read its text. It began with the usual verbiage. The ending was something like this: "We do grant that Bishop Doane be buried within the precincts of the Cathedral at Albany. This act to take effect immediately."—*Lippincott's Magazine*.

**ICE-MAKING IN INDIA.**—Dr. Wells, a London physician, in 1818, in his published essay on dew, was the first to draw attention to the curious artificial production of ice in India. Shallow pits are dug, which are partially filled with perfectly dry straw. On the straw board, flat pans containing water are exposed to the clear sky. The water, being a powerful radiant, sends off its heat abundantly into space. The heat thus lost cannot be replaced from the earth, for this source is excluded by the straw. Before sunrise a cake of ice is formed in each vessel. To produce this ice in quantities clear nights are advantageous, and particularly those on which practically no dew falls. Should the straw get wet it becomes more matted and compact, and consequently a better conductor of heat, for the vapor then acts as a screen over the pans, checks the cold and retards freezing.—*Boston Transcript*.



# THE AMERICAN ARCHITECT AND BUILDING NEWS

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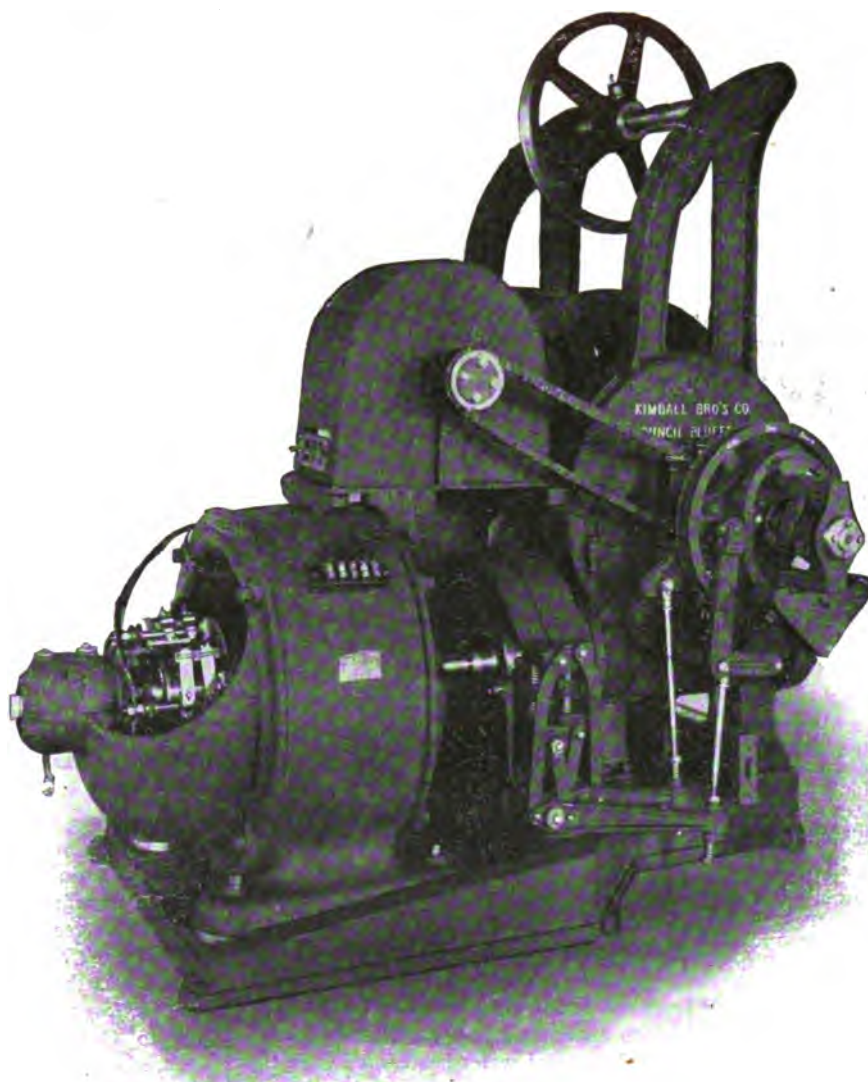
## THE LATEST HIGH SPEED PASSENGER ELECTRIC MACHINE.

THIS machine is designed especially for continuous high-speed work. The worm is 7 inches in diameter, of conical shape, so that it has a bearing in the worm wheel of about 9 inches. The worm wheel is made from genuine phosphor-bronze, both being cut by special machinery to fit perfectly. There are two brakes: the safety-brake stops the elevator at top and bottom floors, and also in case the cables get disarranged or if the governor sets the safety-catches on the cage it will stop the machine immediately. This acts independently of the brake used to stop at different floors.

There is a step box on the outside end of worm case where the end thrust can be taken up both ways; this improvement makes it possible to remove and replace both sets of thrust-bearings in five minutes without locking car or weight or drawing oil out of worm case. These are ball bearings. The limit stop cuts off current and applies both brakes at bottom.

The motor is a self-starting motor, and there is no controller used. It is operated by a switch, which is connected to the hand lever by chain. This saves the extra cur-

rent that goes into a resistance-box. Instead of carrying this current through the resistance-box, it is carried through a series coil in the motor, which gives the machine



that much extra torque in starting, therefore using all of the electricity in the motor which has heretofore been carried off by heat in the resistance coil. This is one of the many styles of machines manufactured by the Kimball Bros. Co., of Council Bluffs, Ia.; Cleveland, O., and New York City.

## THE QUESTION OF DURABILITY.

THERE is always a question of durability in the adoption and use of any style of fireproofing, and inasmuch as there has been question, and criticism on the use of re-enforced concrete, we are pleased to add a little chapter to the subject which is interesting in view of the fact that the authorities quoted are of the highest character. Some three years ago there was built a small annex to the Hotel Savoy, Boston. The fireproof system employed was the Expanded Metal and cinder concrete. The interior partitions and ceilings, in fact all of the exterior work also was built of Expanded Metal and plaster. The building has recently been torn down to make room for a much larger building. While this work of destruction was in course of operation, examinations were made by two very well-known engineering experts, and we are pleased to publish the letters from these two gentlemen. Their

names are sufficient to establish the credibility of the statements made.

"January 15th, 1904.

"EASTERN EXPANDED METAL CO.,  
Boston, Mass.:

"GENTLEMEN:—At your request I made a careful examination of the materials that

are being torn out of the annex of the Savoy Hotel, which I understand from you was constructed three years ago this month. I find that the floors and roof, which were built of cinder concrete reinforced with three-inch No. 10 gauge Expanded Metal, are in perfect condition, the Expanded Metal being absolutely free from rust, and also the steel beams on which the original paint was intact.

"The Expanded Metal lath carrying the plaster of the interior partitions shows in places thin spots of rust, but in no case has this rusting seemed to have gone far enough to appreciably weaken the metal. Most of the lath shows the original bluish color of the metal.

"The outside walls of a part of the structure were made of plaster on Expanded Metal lath covered with Portland-cement mortar about three-quarters of an inch thick. In these outside walls the lath shows scarcely any signs of corrosion, certainly no more than you would expect to find in the lath before the mortar was applied, considering that it was erected in winter weather. The Portland-cement covering of these walls appears to be in perfect condition. I would say that the cinder concrete appears to have been excellent in quality, and shows no signs of the season of the year in which it was laid. Yours truly,  
" (Signed) J. R. WORCESTER."

"February 6th, 1904.

"EASTERN EXPANDED METAL CO.,

Boston, Mass.:

"GENTLEMEN:—At your request I have examined the Expanded Metal construction of the portions of the rear of the Savoy Hotel, Washington Street, Boston, now being demolished to make room for other buildings.

"The floors and the beam coverings and in some cases the minor partitions contained Expanded Metal. The metal in the floors was three-inch mesh No. 10, and for the beams half-inch mesh No. 20. The floor metal had been painted before laying, with what appears to have been an asphalt paint. The lighter metal had been in part, tinned or galvanized. The floors were of cinder concrete 3½ inches thick, and the partitions and beam coverings were in part Portland-cement concrete and in part of a patent hard plaster.

"A careful examination of the floor metal shows it to be as good as when put in position some three years ago, there being only, throughout the whole floor, occasional small spots of rust. These were, apparently, in every case due to a large cinder extending from the steel almost or quite to the outside of the concrete layer. At these places the spots of rust had not eaten into the metal by an appreciable amount, and had in no sense injured the metal nor loosened its bond with the concrete. The concrete itself was of good quality, with very few voids. Where there were small voids it is interesting to note that the paint was still in good condition, but where the concrete had been in contact with it the paint was little more than a powder. The rust spots and the voids excepted, the whole of the metal presented the same appearance that it had when it was laid in the concrete and was practically unaltered. The few rust spots, perhaps of a maximum dimension of about one-quarter of an inch, while showing as discolored places, did not affect the texture of the metal.

"The lighter metal in the beam covering with the patent plaster was not in as good condition, and its condition bears out earlier experience in the use of some of these plasters which contained considerable amounts of plaster of Paris. However, none of this metal which I could find was rusted sufficiently to be in any way liable to weaken the covering. The condition of the metal as a whole adds to my belief that steel of this character bedded thoroughly in concrete, made of Portland cement with stone or cinders, will last almost indefinitely. Further, the grip of the concrete on the

metal does not appear to be diminished by the partial disintegration of the thin layer of paint. Respectfully submitted,

"CHARLES L. NORTON."

#### HANGING WIDE BURLAPS.

In a recent interview, Mr. Paul Richter, president of the Richter Mfg. Co., manufacturers of Tapeptrolea burlaps, referred to a matter that is of interest to many decorators. He said: "When we originated the method of treating burlaps, nearly fifteen years ago, many decorators complained to us that the width, thirty-six inches, was entirely too wide to permit of hanging the goods easily. They said that paper-hangers were so accustomed to hanging ordinary wall-paper widths that when they came to handle goods just twice as wide, they were stumped. In a short time this opposition wore away and yard-wide goods were accepted as regular stock.

"In recent years there has been a steadily increasing demand for burlaps of greater width than usually carried in stock. This is no doubt due to the investigations of shrewd decorators who have found that there is considerable economy in labor in hanging goods as wide as the dimensions of the wall will permit. It has been found, also, that a much better job can be made with wide than with narrow goods.

"If a single strip is used to cover a side wall there certainly never will be any seams to open up or matching to be done; the strips cut out for the door and window openings can always be used to advantage somewhere, so that the extra cost of the wide goods is reduced to a minimum. A considerable part of our orders now are for widths wider than 36 inches.

"This demand has been so great that we have had to install special machinery. It is no uncommon thing for us to receive orders for 120, 144, 216 and even 278 inch Tapeptrolea burlaps. It indicates that workmen are becoming more skilled in handling such fabrics and that owners require a higher grade of work than formerly."—*Canadian Decorator and Painter.*

#### MONARCH WATER HEATER COMPANY.

THE Monarch Water Heater Company, formerly of Pittsburgh, have removed to 1,300-1,342 River Ave., Allegheny, Pa., where their offices and large new works are now concentrated. The large demand for the Monarch water-heaters necessitated the securing of larger quarters for their manufacture and the company bought some months ago the works formerly operated by the Standard Sanitary Manufacturing Company and have remodeled them to suit their requirements. They have also built a foundry to make their own castings used in the manufacture of water-heaters, and are thus able to guarantee to the trade the very highest quality of materials used in the manufacture of their heaters. Their products consist of Monarch, Columbia and Colonial automatic instantaneous water-heaters, also the Mystic and Junior instantaneous water-heaters, and the Peerless, Caloric and Rival boiler heaters. They have also several new styles of water-heaters under way, which they expect to have in the market within a short time. The com-

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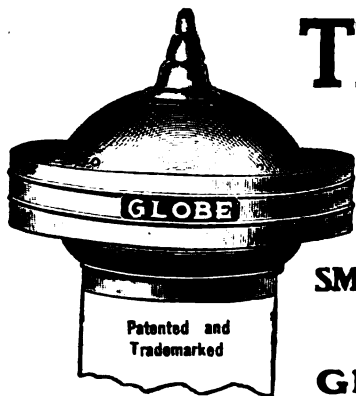
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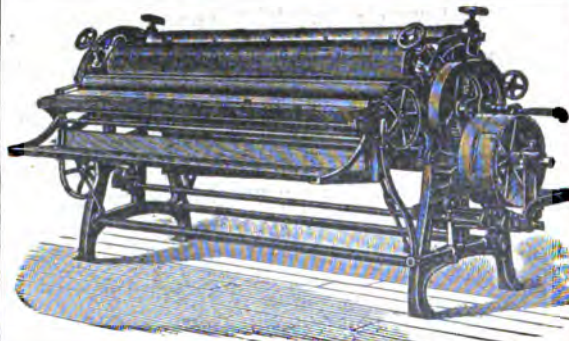
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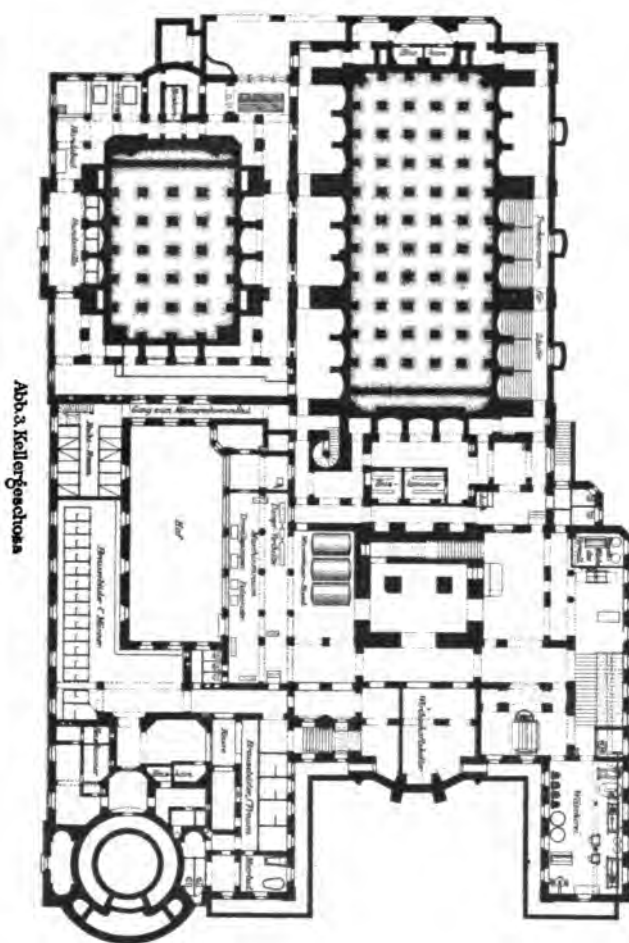


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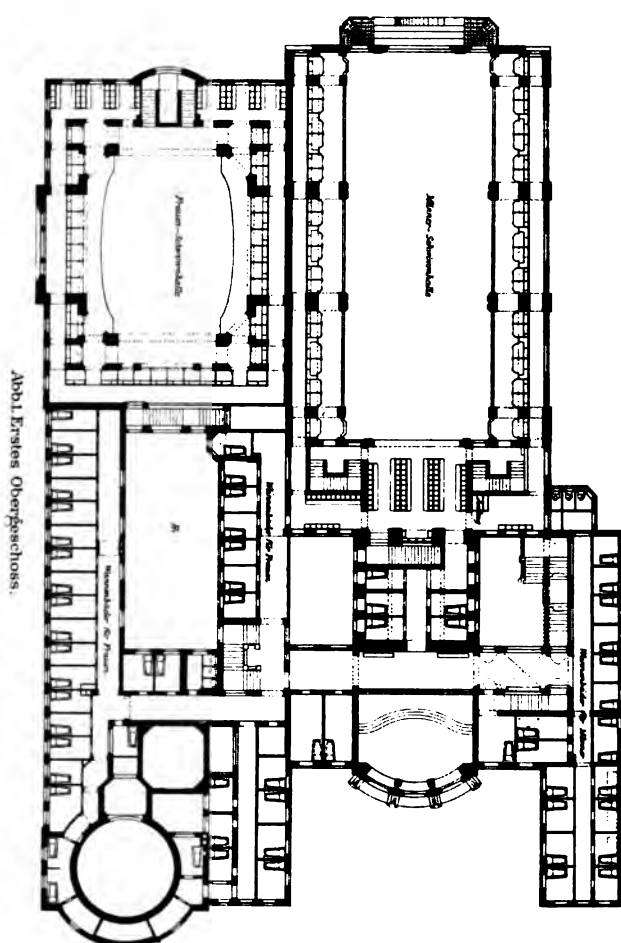


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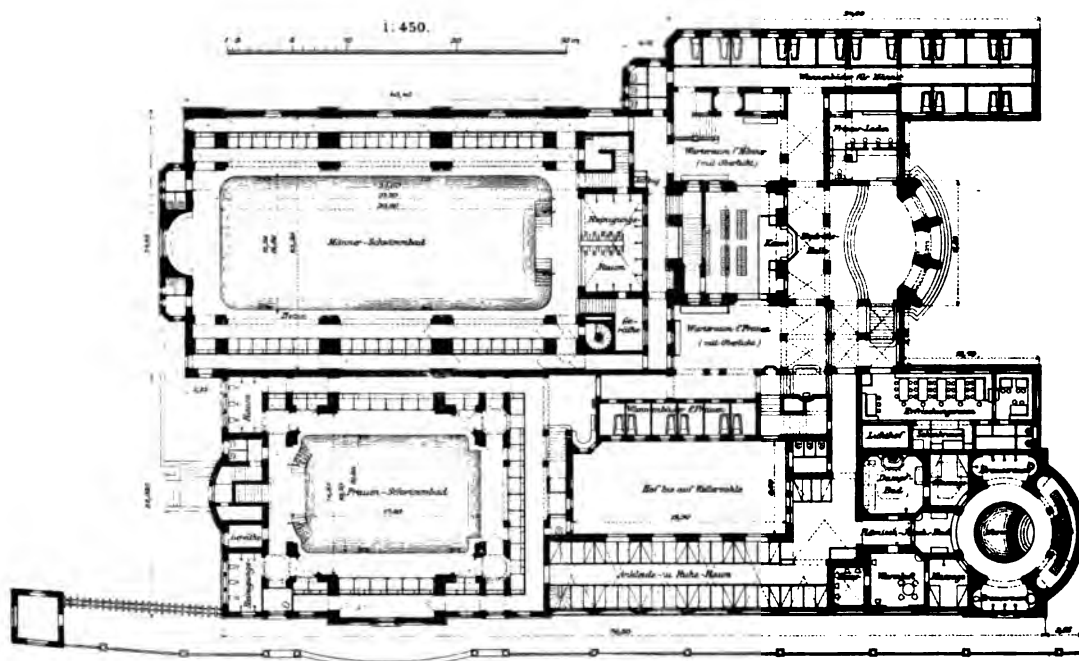
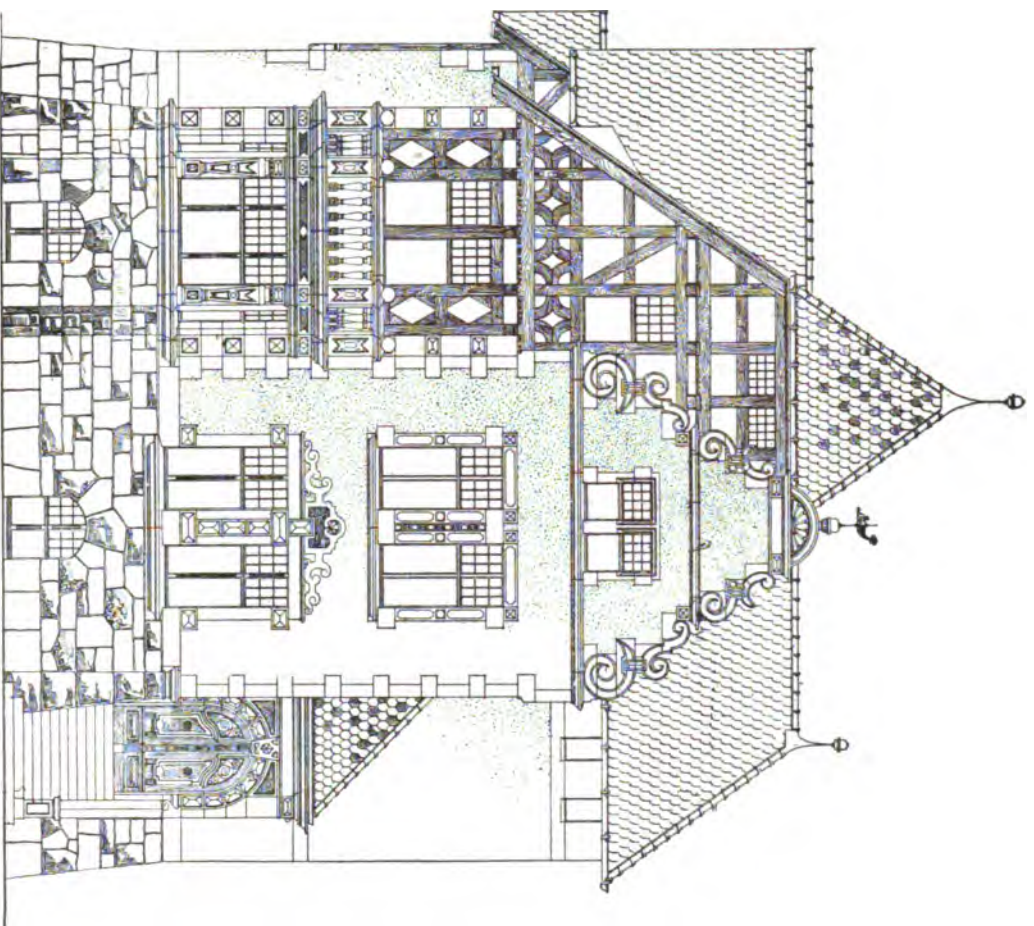
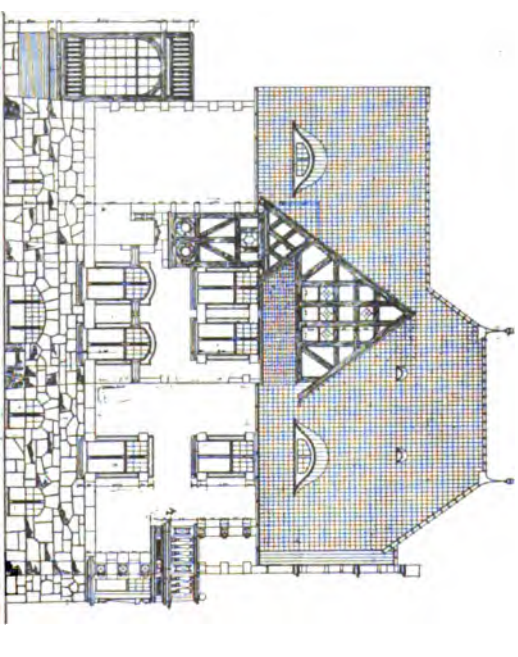
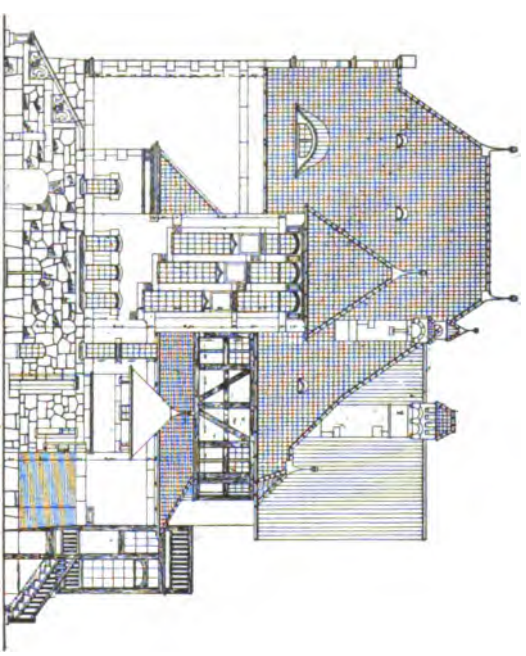


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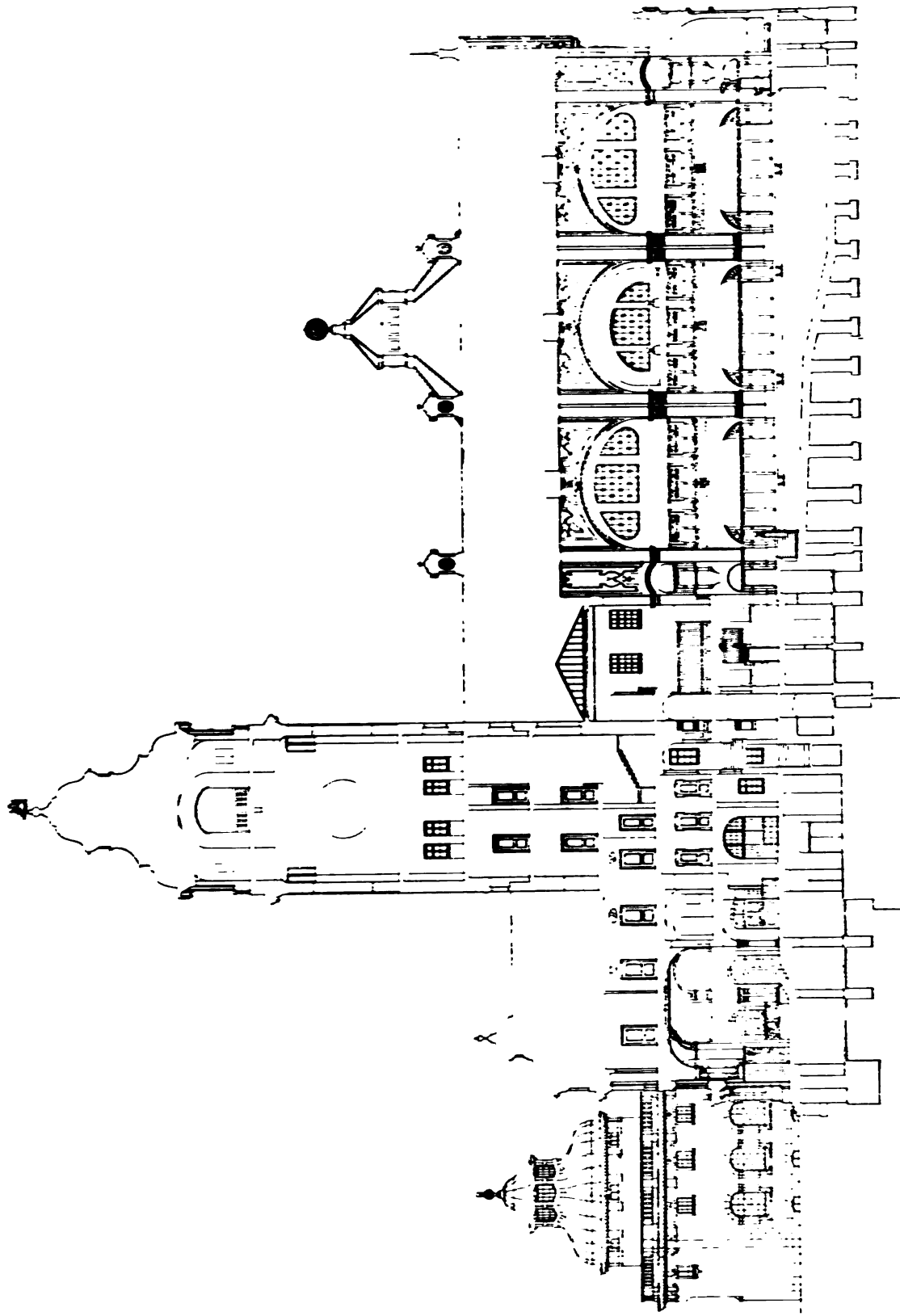
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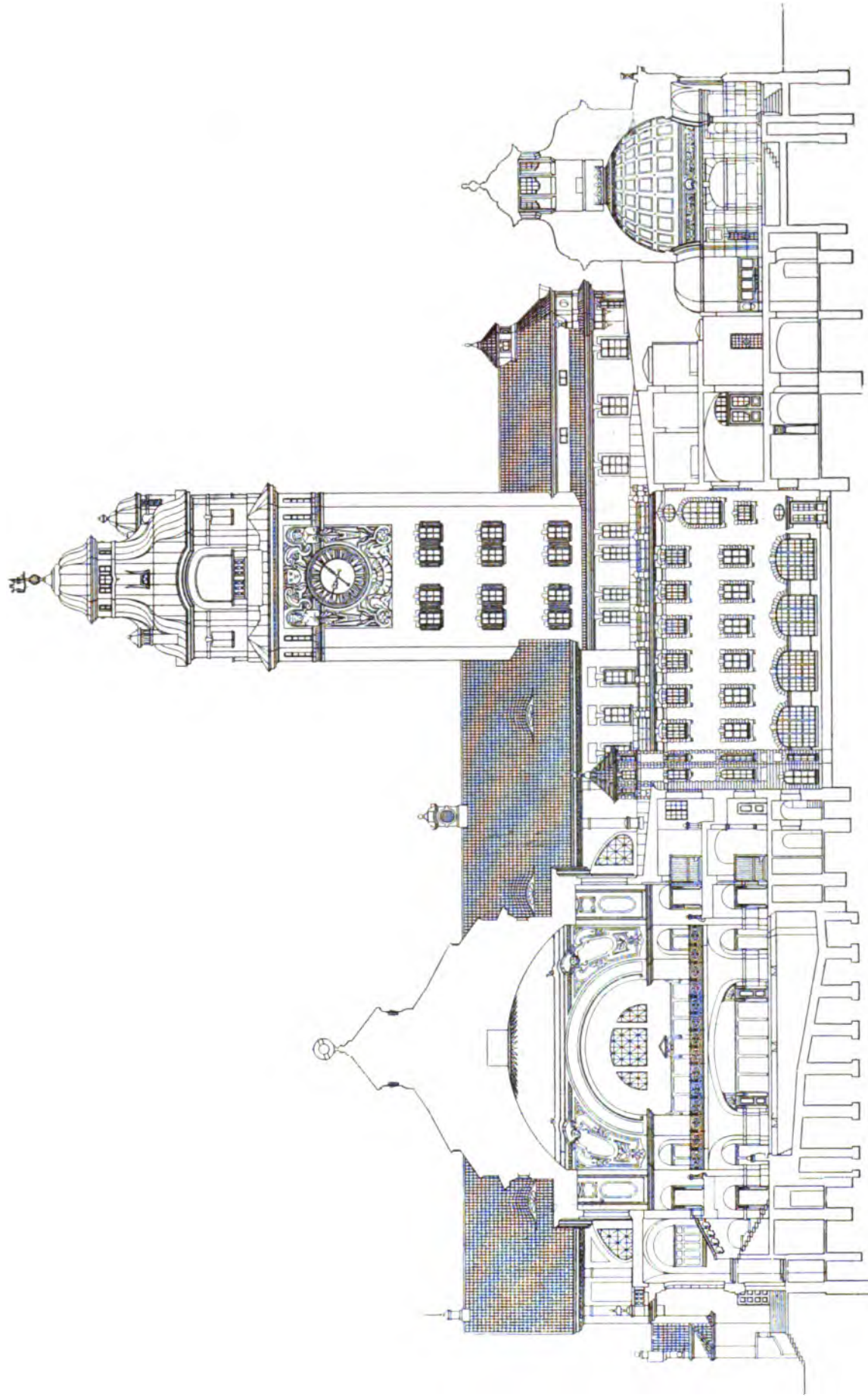








Longitudinal Section: The Karl Müller Peoples' Baths, Munich, Bavaria



1:250.

*Longitudinal Section: The Karl Muller Peoples' Baths, Munich, Bavaria.*

*From Zeitschrift für Bauwesen.*

*The American Architect,  
August 13, 1904.  
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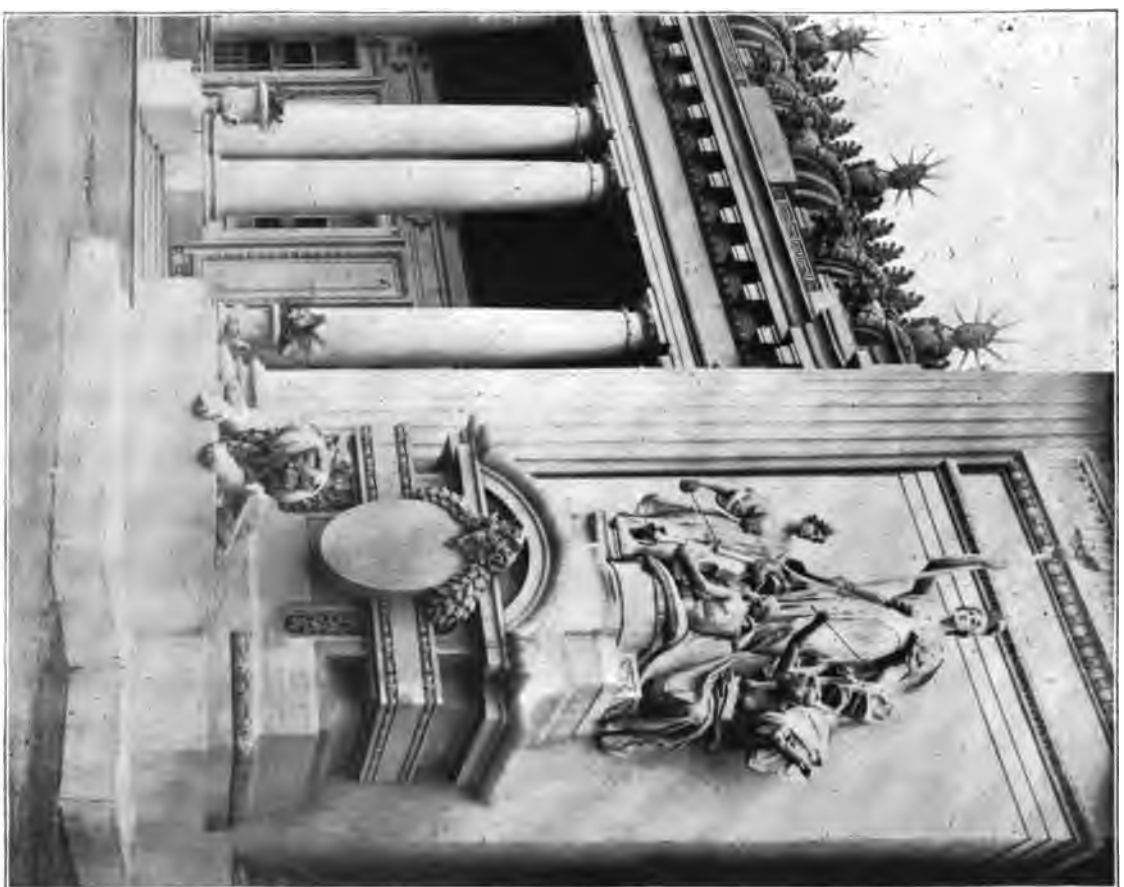






***The Karl Müller Peoples' Baths, Munich, Bavaria.***  
*Karl Hocheder, Architect.*





*Details from the Palace of Liberal Arts: Louisiana Purchase Exposition, St. Louis, Mo.  
Barrett, Haynes & Barrett, Architects.*



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**A** FIRE in Boston a fortnight ago gave the fire-department a very difficult problem to handle, and incidentally afforded an illustration of the virtue of slow-burning construction. We believe the method of construction employed in building the grain-elevator we refer to was a very unusual one; at any rate, when it was built, some thirty years ago, it attracted much attention. The walls above the brick basement were of solid timber eight inches thick, formed by laying two-by-eight spruce plank flatwise all about the building and spiking each succeeding layer of plank to the course below, the cross-walls of the grain-bins being built in the same way, each alternate plank of the cross-walls lapping over the wall-planking, so as to give proper bond; the outside walls were covered with slate. At the time of the fire the building was empty, the lumber was dry as tinder and, as is shown, there was plenty of it, so that the fire was one of unusual intensity, for the material was admirably disposed, as the lower story into which the outer doors opened served admirably as a fire-box, with abundant air-supply. As there were no windows in the walls, the firemen had to fight the fire through the lower doors and through the roof when that gave way, having, we believe, to keep streams upon the ruins for something like thirty hours. One would think that such a building exposed to so intense a fire would have been consumed, but this was far from being the case. When one of the lower corners gave way, through the action of fire and the yielding of the basement brickwork, the huge parallelipedon formed by the solid timber walls simply canted in that direction and dropped to a new bearing on the ground; and there the ruin stands at present, only to be got rid of by tearing it to pieces plank by plank. One of the sides where the timber is exposed through the flying of the slate covering looks as if it had been attacked by a flock of giant wood-peckers, for the flames here and there had worked through a crevice and might have got a hold

on the outside surface but for the hose streams. Fierce and lasting as the fire was, it succeeded in burning only about two inches of the substance of the inner surface of the walls, while its intensity is shown by the fact that some of the yellow pine uprights in the lower story, which supported the bottoms of the bins, were, though sixteen inches square, entirely burned away at their tops, leaving only more or less acutely pointed frustums standing.

**N**OW that there are fairly satisfactory processes for fireproofing wood, it would seem as if it might be worth while to revert to this method of building grain-elevators. Usage and time have shown that bins so built are capable of withstanding the immense and ever-varying static pressure that service puts upon them, while other elevators built of brick, of iron and of concrete have failed in different parts of the country, causing large loss of property and sometimes of life. As built, the Boston elevator had only two disadvantages: it was combustible—a defect which modern fireproofing methods could now avoid—and a very considerable shrinkage had to be allowed for. As most of the machinery was in the lower story, shrinkage did not materially affect operations, but we remember that for a long time it caused serious trouble with the slating on the vertical walls.

**S**PEAKING of fireproof wood, it is well, since we have referred to the matter, to say that Mayor McClellan put his veto on the ordinance by which the New York Aldermen attempted to make the employment of fireproof wood compulsory in all private buildings seventy-five feet high, and all public buildings over thirty-five feet high. The Mayor pointed out that the new measure would not only in certain cases allow less satisfactory buildings to be built than under the present regulations, but that the building operations of the city would be brought to a standstill, since it would not be possible to secure enough of the treated wood to supply the average needs of builders.

**B**ECAUSE the city of Oakland, Cal., wishes to hold a public competition to secure designs, specifications and drawings for several schoolhouses under conditions that seem to be unsatisfactory to the architects of that neighborhood, the San Francisco Chapter, A. I. A., has prepared and distributed a protest embodying fourteen "whereases" and four resolutions, which to us seem more likely to cause irritation than to bring about an amelioration of the situation. The mistake, it seems to us, lies in the resolution that it would be "detrimental to the interests of the city of Oakland if any but certificated architects were admitted to compete." This smacks of trade-unionism pure and simple, and comes with ill grace from men who probably are outspoken in condemnation of the similar efforts at exclusion made by labor unions. Actions speak louder than words, and if the holders of certificates are really superior to those practitioners who do not hold them, there is no need to say anything



about it. The circular would have been more effective if shorter and if it had said more simply that one per cent for six different sets of drawings calling for a building outlay of six hundred thousand dollars was too small pay for the work; that giving a bond was quite out of the question; that an expert adviser would be a help to both the officials and the competitors, and that the Chapter would provide such expert free of cost. The "dignity of the architectural profession" and the "rules of the American Institute of Architects" are matters which such building-committees have no respect for, and they are likely to resent all such references as so many attempts to teach them "manners."

**A**LTHOUGH the Chapter has replied at great length to the unusually unfair invitation of the Oakland Board of Education, it has neglected to reply to one of the fairest of the stipulations. In this stipulation the Board "reserves the right in accepting any plan or plans to have such alterations made in the plans as will in the opinion of the Board improve the building without adding to the estimated cost of the same, and such changes in the plans *shall be made by the architect without additional cost to the Board.*" Under this stipulation the Board could oblige its unfortunate architect to alter every feature of his design and absolutely rearrange every combination of his plan, steps which would, of course, entail a careful revision of the specifications. The Board would only have to allege that the required changes "will in the opinion of the Board improve the building." How the Board proposes to deal with the architect in case the changes commanded compel an increase in the "estimated cost" does not appear. As payment for the fruitless labor cannot be intended, it may be that in such case the Board intends to confiscate the private property of the unfortunate "successful competitor."

**T**HE Comptroller of the Treasury is either a very poor politician, a very bellicose man or a good business man who has a respect for the law. He has assured the Secretary of War that it is not proper to pay a full day's wages for Saturday's half-day work, and as he has the decision in such matters, it is not likely that the workmen employed on the barrack building at Washington, the scene of the recent bricklayers' strike against a non-union man, will get the "unearned increment" they counted on. It would be very refreshing to find that, through its contests with the Federal Government, Labor could be brought to understand that all men alike are subject to the operation not only of statute law but economic law as well. A great deal of unnecessary mischief has been done through the yielding, for political reasons, of municipal and State authorities to the demands of laboring men. It has been easy to secure the passage of ordinances requiring shorter working days and better pay for men employed on public work, and that has always had an unsettling effect on the labor market, both in the matter of hours and the rate of pay, the constant and natural effort of workmen not in public service being to secure the same shorter hours and better pay. But if the Federal Government will insist that if workmen wish to work shorter hours they must accept propor-

tionately less pay, perhaps States and municipalities may take courage and decline to treat the laboring man occupied in the public service as an exceptionally favored citizen.

**M**UTUAL professional defence, which, as we have frequently pointed out, is so desirable and so possible for the architect, is still more desirable for the members of another profession. The ordinary man does not guess how often it is that a physician is either actually sued or threatened with a suit for damages because of alleged malpractice—not criminal malpractice, but the ordinary kind, due to ignorance or carelessness. Except in the surgical branch, medicine cannot be considered an exact science, and the chances of mistaken diagnosis and prognosis are inevitably great, and blunders are continually made, however innocently, and consequently the unreasonable or evil-disposed have ample opportunity for bringing genuine or blackmailing damage suits against an unfortunate practitioner whose only defense must and can be that his treatment was that which would have been adopted by other practitioners under the same circumstances. The New York State Medical Association, and perhaps similar organizations in other States, defends at its own cost suits brought against its own members in all cases where the officials of the society are satisfied that the accused physician has exercised due care and diligence. In the last three years it has had twenty such cases to defend and has won every one of them. The due care and diligence required of a doctor are not different in the essence from the due care and diligence which the law exacts from the architect, and it but adds to our own belief in the desirability of establishing a mutual defense association for architects in this country to know that physicians are enjoying the benefits of the method.

**I**F one has any interest in philology, the growth of a language through the invention and adoption of new words is an interesting matter to watch, and it is only reasonable to foresee a considerable increase in the American branch of the English language through the adoption of more or less foreign words that have caught the fancy of our workmen as they labor side by side with mechanics coming from all parts of the globe. Mechanics find themselves continually compelled to invent new names for new parts of new machines, and inventors often invent a name at the same time that they invent a machine, and now and then one of these names secures universal adoption, both as noun and verb, as "kodak," for instance, a word which has no philological derivation whatever. Botanists, chemists and, latterly, electricians have been prolific in the invention of new words, a large part of which are mere philological grotesques. But we do not believe it would be possible to find a more detestible series of new words than has been provided for that very useful apparatus, the modern calculating machine. Not being satisfied with such simple names as adder, calculator and mechanical accountant, the inventors of recent machines have bestowed on them such abhorrent titles as "addograph," "arithmometer," "arith-machine," "comptograph," "calcumeter," and "omni-metre."

THE STEEL-CONCRETE WORK OF THE HARVARD STADIUM.<sup>1</sup>

**A**LTHOUGH the Harvard Stadium is well known in its general character to many members of this society, it may be well at the outset to recall briefly some of its main features.

The Stadium is a steel-concrete and steel grand-stand, U-shaped in plan, to accommodate some 23,000 spectators at football and other games on Soldiers' Field, in the Brighton district of Boston. It is intended to furnish a permanent, fireproof and architecturally pleasing structure in place of the short-lived and unsightly wooden grand-stands hitherto in use.

The structure consists essentially of five parallel rows of steel-concrete girders, columns and piers, extending around the U from tip to tip, and supporting a system of steel beams and trusses crossing them transversely. This transverse steel work in turn supports lines of steel-concrete slabs running around the U and forming the seating surface. The rows of steel-concrete work are designated by the letters A, B, C, D and E, counting from the interior outward. Row A, besides supporting ends of steel beams, includes the front parapet, a wall about nine feet in height and continuous around the U. Rows B and C support only steel work; row D supports the outer ends of the steel work and shares with row E the support of two steel-concrete promenades or galleries about twenty feet in width at levels of about 25 and 50 feet above the ground and running from tip to tip of the Stadium. Row E is a line of hollow piers separated by two stories of arched openings, and ultimately to carry a wall at the third story which, with the aid of a colonnade surmounting row D, will support the roof of the upper promenade. The openings of the lower of the two arcades of row E afford access to the stairways to the seating surface, and the openings of the upper afford outlooks from the promenade behind them.

The steel-concrete work includes, besides all the columns, piers, main girders, floors and the seating surface above mentioned, the outside and end walls, the staircases and all parapets and railings. The foundations are all of concrete, some reinforced, some plain. All parts exposed directly to the weather are of steel-concrete.

The developed length of the U at the outside row is 1,390 feet, and the uniform width across from front to back of the wings of the U is 98 feet. The area actually under cover is some 120,000 square feet, about 40 per cent of which is devoted to the semi-circular end, and the rest to the two straight wings. The lowest seat is about 8 feet and the highest about 48 feet above finished grade. The number of rows of seats is 31.

The over-all length of the Stadium is 575 feet, and the width is 420 feet, both exclusive of some small towers to occur at each tip of the U and a flight of two or three steps to extend the whole length of the outside. The highest part of the structure now finished is about 53 feet above the ground, but the addition of the covering for the upper promenade will make the final height 71 feet.

Durability, adaptability to rapid construction, coupled with its æsthetic possibilities and moderate cost, are the qualities which led to the use of steel-concrete to the extent above described. The steel work used to supplement it is under cover, accessible for painting, and will be kept isolated from combustibles, and is hence deemed acceptable from the point of view of permanence. It was fabricated while the concrete to support it was being placed, and much time was thus saved, and, under the circumstances, probably some money.

Most of the concrete work was cast in place in wooden forms in the ordinary way, but the slabs of which the seating surface is composed were of a special mixture and were cast in sand molds upon the ground in units weighing about 1,200 pounds each, and after hardening were hoisted into place and set upon the supports which were meanwhile being prepared for them. The concrete cast in the wooden forms is to be picked so as to remove the board marks, while the seat slabs have a satisfactory surface given by the sand mold. The steel reinforcement in all the concrete consisted of Ransome cold-twisted square steel bars (ranging in size from quarter-inch to inch), supplemented in the seat slabs with a special wire netting with rectangular meshes, electrically welded at the joints.

The concrete was mixed by machinery, two Smith mixers operated by gasoline engines constituting the plant for the purpose.

Constants for use in the concrete design were taken at figures

to be regarded as suitable for ordinary Portland-cement concrete of 1:3:6 mixture, though the concrete used was of varying mixtures, always considerably richer than 1:3:6. An attempt was made to use concrete of special mixtures for special places in the work, but this was found to be impracticable under the conditions—except, as above stated, in the case of the seat slabs.

Three grand divisions of the work went on simultaneously—the casting of the standing concrete (work going on on both wings at once), the manufacture of the structural steel work and of the concrete slabs. The results of these three operations were assembled by the setting of the steel work and the slabs.

The Boston Bridge Works had the contract for the manufacture and erection of the structural steel, but the steel-concrete work was done by day labor, the Aberthaw Construction Company being employed as purchasing agents and as field executives to devise, install and operate the steel-concrete construction plant.

The Harvard Athletic Association furnished the general and detailed designs for the entire structure, the architecture being in the hands of Messrs. C. F. McKim and G. B. de Gersdorff, of New York; the engineering design was the work of Mr. J. R. Worcester and the writer, and the whole was under the direction of Professor I. N. Hollis.

The foundations are of the simplest character, as borings showed only hard gravel and clay to a depth of at least 40 feet. They are mere concrete or steel-concrete blocks laid on the natural ground just below frost, so proportioned as to keep the maximum pressure on the ground from exceeding 7,000 pounds per square foot.

The methods and principles followed in the design of the remainder of the concrete work may conveniently be taken up under three general heads, viz:—

- (1) Columns.
- (2) Girders (simple and cantilever).
- (3) Walls and parapets.

## COLUMNS.

All the columns contain twisted rods in the form of verticals at the corners, with or without horizontal hoops at close intervals. This steel was not, however, counted on as furnishing compressive resistance. Its utility was conceived to lie in withstanding any slight flexure that might come upon the columns from lateral forces due to temperature changes or other causes. This reinforcement consisted of three-eighths and half-inch rods, depending on the size of the column, one such rod being placed near each corner of the column. In order to guard against the risk of such slender rods buckling when too near the surface, square hoops of quarter-inch rods encompass them in horizontal planes at intervals, keeping their free or unsupported lengths within reasonable limits.

Besides adding flexural strength, as just described, this steel furnishes some protection against the failure by shearing on planes inclined about 55 degrees to the horizon characteristic of prisms of materials like plain concrete. It was not overlooked that Professor Hatt found<sup>2</sup> reinforced concrete prisms to stand compression rather less well than plain ones, but it was by no means clear that his conditions were repeated in the Stadium, and the desirability of a slight amount of flexural strength already mentioned, and of the increased protection furnished by the steel against shrinkage or other cracks, made it seem on the whole preferable to use it. The columns proper range in size from 14 x 14 inches to 24 x 33 inches. Besides these, and designed in the same general way, with corner vertical rods and horizontal hoops, except that they are hollow, are the piers showing in the outside wall and already mentioned, which are externally 66 x 36 inches, the walls along the 66-inch side being 4 inches thick and the other two 6 to 8 inches thick, the 8 and 6 inch ends being counted on as furnishing the whole compressive strength.

The cross-sections of the columns were determined by applying an allowable compressive stress of 350 to 400 pounds per square inch to the maximum combined live and dead load, increasing the results thus obtained whenever necessary to keep the ratio of the length to least side of column down to about twelve, or to give round numbers for dimensions of the section. The structural steel work and concrete girders and struts were arranged to aid in keeping down the ratio of length to least side.

## GIRDERS.

Out of the multitude of methods advanced for the design of steel-concrete girders, one based upon the observations of Prof.

<sup>1</sup> Extracts from a paper by Mr. Lewis J. Johnson, M. S. C. E., read before the Boston Society of Civil Engineers and published in the *Journal of the Association of Engineering Societies*.

<sup>2</sup> *Engineering News*, July 17, 1902, p. 54.

W. K. Hatt<sup>1</sup> was adopted throughout the work. This method seemed at least as rational as any; it gave conservative results, and (thanks to suggestions drawn from Mr. J. W. Schaub's letter in the *Engineering News* of April 30, 1903, p. 392) was very easy to use. This method ignores the tensile strength of the concrete, assumes a parabolic distribution of compressive stress and assigns a position to the neutral axis dependent upon the percentage which the cross-section of the steel tension flange bears to the whole cross-section of the girder. The proper and economical percentage of steel being dependent upon the relative cost of concrete and steel, about seven-tenths of one per cent was a value commonly used in the Stadium, though it is a question whether a higher one might not have been generally more economical. With the assumed steel percentage, the maximum unit compressive stress in the concrete was determined for the load which would be supported at the appearance of the first crack on the tension side, and a fraction of this load was taken as the allowable load, this fraction being the ratio of the assumed allowable 500 pounds per square inch to that figured out by the parabolic principle as the maximum at the time of the first crack. Thus the maximum working compressive stress on the concrete is believed to be kept from exceeding 500 pounds to the square inch.

The appearance of the first crack was assumed to be accompanied by a tensile unit stress of 36,000 pounds per square inch in the steel. This is considerably below the elastic limit of the steel used, but it implies an elongation of about one-eighth of 1 per cent, which was taken to be as much as even armored concrete should be trusted to stretch without a crack.

The steel-concrete beam work included simple girders, 24 feet 9 inches in span, with sections 16 x 47 inches, 18 x 45 inches, 22 x 60 inches and 24 x 60 inches, and two systems of curved (radius 190 feet) cantilever girders in row D with sections 18 x 45 inches and 24 x 60 inches respectively. The cantilever system permitted the retention of the same cross-section throughout the curve in this line of girders as was used on the tangent, and to some extent counterbalanced the rotary effect of the curvature of the girder. The ends of cantilevers and of suspended spans being critical points subject to very severe shear, they were stepped so as to reduce the effective concrete area as little as possible and armored with special care. The stirrups used here were of special construction, placed in an inclined position, and were designed to resist the whole vertical shear.

The cantilever ends tend to act as joints at which the shrinkage stresses are relieved. The first suspended span to be built shortened in hardening and slipped on the treads of one of the stepped ends so as to show a crack throughout the extent of the risers of the joint, and in slipping spalled the corners of the steps slightly. After this, four 1-inch rods were put in at mid-height of the girder and lengthwise with it, crossing the joint and extending into both the cantilever end and suspended span far enough to develop the strength of the rods with a view to prevent this slipping, and, so far as seen, the result has been a success. Shrinkage joints are thus kept about 115 feet apart in this line. At the ends of these intervals are opportunities for shrinkage to take place harmlessly. Besides using the rods, the steps were finished off with a troweled surface truly level, so as to leave things in shape for a harmless slip should the rods prove ineffective. It was at one time planned to use two quarter-inch steel plates lubricated with graphite at each of these treads to facilitate sliding and to prevent spalling, but it did not finally seem necessary to go to such a length.

These lines of cantilever girders were subject to a very complex set of loads and were much cut up by promenade-floor beams and passageways for stairs. The girders in row C, on the curve, were all straight—a series of chords—but they support the ends of trusses and are hence much larger than the girders of the same row on the tangent, their section being 22x60 inches as against 16x47 inches.

The promenade floors were made of slabs of inverted trough section about 8 feet 3 inches wide and some 20 feet in span, cast alternately in place, thus providing shrinkage joints at the edge of every slab; the thickness of the body of the slab is 4½ inches, exclusive of the granolithic finish, and the flanges are 6x18, making practically a ½-inch flat floor resting on 12x18 joists 8 feet 3 inches on centres and 17 feet in span.

The seat slabs are a series of —'s set up so as to form a flight of treads and risers. They are of crusher-dust concrete (poured at a consistency of cream) reinforced by a half-inch

rod at the base of each riser and electrically welded steel wire netting with rectangular mesh furnishing straight wires 0.162 inches in diameter, 5 inches on centres running across the treads and up the risers. The wires running the other way are somewhat smaller and closer together. In the treads this netting furnishes the ordinary tensile reinforcement for the span from riser to riser, besides hanging one edge of the tread to the base of the riser, and in the risers it furnished vertical reinforcement against shear, for the risers constituted a series of joists running from one steel beam to the next, the span being usually 8 feet 3 inches.

These slabs were cast in small units of about eight cubic feet each to facilitate handling and to provide amply against shrinkage cracks. They were some 4,800 in number, and, including those on the curves, required ninety-five different patterns, counting rights and lefts as alike, and in many cases counting as alike such patterns as varied only slightly in length. On the semi-circle they were made curved, but a constant radius was used for all, regardless of their distance from the centre. The true radii would have had thirty-one different values, ranging from 115 to 189 feet, but 166 feet 8 inches was chosen as a convenient mean to use for them all.

The handling which all these slabs underwent in storing and placing formed an automatic system of testing, which was considered a distinct advantage of the method of manufacture. They were cast with one-eighth-inch allowance for end joints, but the sand casting proving to be a less accurate process than was expected, more or less picking and clipping had to be resorted to in setting them. An additional and probably more important cause for such modifications was inaccuracy in the steel-setting.

The treads of these slabs are an illustration of concrete reinforced with a small percentage of steel and accordingly rated for strength from the point of view of the steel. This strength is ample almost to excess, even with this small allowance of steel, yet thinner sections of concrete were not seriously considered, three and a quarter inches on the average being adjudged a suitable minimum from the point of view of resistance to abrasion, shocks, etc., and the omission of the steel netting altogether was, of course, not seriously entertained—even though the concrete might, by counting on its tensile strength, be figured out as strong enough.

#### WALLS AND PARAPETS.

The special problem in the design of the walls and parapets which will be considered here is how best to provide for shrinking so as to minimize the evil of cracking from this cause or from temperature changes. One way is frankly to leave joints at short intervals free to open, using steel reinforcements between these joints to compel all the cracking effect to appear, if at all, at the joints left. These joints are supposed to open in tolerably straight, clean cracks, less unsightly than random cracks would be. They are unsightly enough, however, and it is difficult to make the cracks turn out as straight as expected. There is, therefore, a strong incentive to resort to the other method of treatment and attempt to prevent all cracks from temperature and shrinkage changes by the aid of proper reinforcement with steel. M. Considère's experiments afford a rational basis for expecting success from such a venture, reinforced concrete having been shown by him to be capable of stretching, without showing cracks, to an extent far greater than that of plain concrete. Mr. A. L. Johnson reports<sup>2</sup> actual success in building a concrete wall 300 feet long, 8 inches thick and exposed on both sides to the weather, without any joints, and with no cracks appearing in the first year, or up to the time of his report.

In the outside wall of row E of the Stadium there was nothing else to do but to depend upon steel reinforcements to prevent shrinkage cracks. It was a place where cracks of any kind would be most objectionable. Expansion joints were left at intervals of 16½ feet, as in the front parapet, but they had to be placed over the centre of the piers, in spite of its being realized that the friction from the weight of the superimposed mass would probably prevent all sliding, and thus prevent such joints from being effective. The amount of shrinkage to be expected in setting, or cooling to the minimum temperature, was estimated not to exceed about 0.0005 to 0.0006 of the length. Professor Hatt found<sup>3</sup> that 1:2:4 concrete with 1 per cent reinforcement would stretch 0.00088 before cracking. Considère and A. L. Johnson lead us to suppose that this stretch may be considerably more. At any rate, the margin seemed sufficient, and as the

<sup>1</sup> *Engineering News*, February 27, 1902, p. 170 and July 17, 1902, p. 53.

<sup>2</sup> *Railroad Gazette*, March 13, 1903, p. 183.

<sup>3</sup> *Engineering News*, July 17, 1902, p. 55.



two faces of the wall in question were only 4 inches thick, 1 per cent reinforcement was quite feasible—only a half-inch rod every six inches being required—and was adopted. Thus far, after several months from the completion of the first of this work, neither crack nor opening of the joints in the whole extent of the two lines of nearly 1,400 linear feet each (with one or two insignificant exceptions) has come to the writer's notice. The joints not opening show that the concrete between them must have stretched as expected. The results of the winter's exposure are looked forward to with much interest.

The front parapet was executed upon the principle first mentioned, shrinkage joints being left every 16½ feet, which opened perceptibly immediately upon the hardening of the concrete, and now constitute open joints sometimes a sixteenth of an inch in width, changing as the temperature rises and falls.

The experience with the back wall being reassuring, and the tying together of row D into continuous sections of about 115 feet each causing no harm, it was determined to apply the same principle to the broad expanse of the end walls, which forms the finish at the tips of the U. These walls are some 75 feet long and from 9 to 50 feet high. They are in the main mere curtain walls only 4 inches thick, supported by a series of columns with which they are monolithic. These walls are armored freely with quarter-inch rods—less care being taken to keep the percentage up to 1 per cent than was observed in the back wall, the smaller area involved being regarded as justification for venturing below the 1 per cent. These walls have now been stripped several weeks, and so far no cracks in them have come to the writer's notice.

It was seen, as the work progressed, that the completion of the Stadium with all the architectural ornaments before the Yale game was out of the question, but work was pushed on the parts essential for carrying the seats, and by the use of temporary woodwork instead of concrete slabs on the steel beams of a portion of the structure, the whole seating surface was ready for use some days before the Yale game, and on the day of that game, five months and two days from the setting of the first batterboards, and less than five months from the turning of the first shovelful of earth, the Stadium was occupied comfortably to its full final capacity.

#### DISCUSSION.

PROF. ARTHUR W. FRENCH, Worcester Polytechnic Institute.—In planning a concrete-steel building, before reaching the details, careful consideration of the peculiarities of concrete-steel combinations may well decide many important features in the layout of walls, columns and beams.

With the available space below the seats of the Stadium, it may be a question whether the girders of 24 feet 9 inches span, carrying heavy concentrated loads, might economically have been replaced by shorter spans and a greater number of columns.

I can but feel a bit of regret that such a monumental structure was not planned to avoid all exposed structural steel, and that reinforced concrete, which forms so large a part of the Stadium, was not used exclusively.

The first thing that strikes one as peculiar in the construction of concrete work is the fact that the structure cannot be built as a monolith; that it is cut up, as Professor Johnson has shown—cut up into sections to provide for expansion and for possible cracks. This leads to many complications. The day's work is stopped at places where, on the plans, it would look as though filling up with concrete might go on; the day's work at certain points is limited, and the work must be spread over considerable areas. If we dared to build such structures without joints it would greatly simplify the matter.

The spacing of the steel in the columns offers some difficulties, especially with the hoops. The four rods in the corners of the columns, without the hoops, are very easy to keep in place, and to keep exactly at the right distance from the corner.

The minute the hoops are introduced we must have a free chance, from the top to the bottom, to drop the hoop over the four corner rods, and it was with some fear of having them show through the concrete that I placed them as shown. However, I think none of them have shown through. The packing of the steel in the beams has been well illustrated; and the introduction of stay rods, for the purpose of taking up the shearing, adds to the difficulties of placing the concrete.

One feature of the concreting, very pleasing to me, was the agreement, between Professor Johnson and the Aberthaw Company, as to the consistency of the concrete. Being a firm believer in wet concrete, I was delighted to have a chance to use it.

Those columns, 14, 16 and 24 inches square and 25 feet in

height, we found it would be impracticable to fill, except from one stage at the top. If that concrete had been put in dry, or of the consistency advocated by some in the past, it would have been difficult to produce smooth or solid work. It was put in wet enough to spade easily into place, the spades being worked continuously, usually by two men. I think those of you who have seen the work have noticed that it shows full, without voids. Experiments show that it is equally solid throughout.

As to the effect of consistency upon the strength of the concrete, there may be a difference of opinion. I believe that, after a lapse of time, it will compare favorably with any drier mixture.

The work at the Stadium was a summer's vacation for me, and one leading to very pleasant connections with the supervisors and those in charge at Harvard. My particular interest was in the study how to place that work. The plan adopted was, I think, fairly satisfactory, as shown by the time taken to bring the work to such a state of completion that it could be used. The structure is 50 to 60 feet in height, and has various heights. Except the 16-foot promenades, there were no level landings upon which to place derricks, and the first question was to design the handling plant. We adopted towers and cableways, as you noticed on the slides. They have their limitations, but, on the whole, were fairly satisfactory. The towers were rolled along on tracks and placed wherever the cables could be used to the best advantage. The casting floor of the foundry was served with cranes and railroad tracks, as was clearly shown.

The subject of concreting with steel reinforcement may be made too complicated, so far as theory goes. I am perhaps not competent to judge, but it seems to me the design of the section of a beam will be changed. The variations in the modulus of elasticity in concrete prohibits any fine computation of sections, and I believe it will be, as Professor Johnson has shown, so simplified that any engineer will pick out his concrete-steel beams with something of the confidence he feels in choosing timber, and with similar limitations.

I think there is nothing further I can now add to the discussion. I am glad to acknowledge my indebtedness to the Society and to Professor Johnson for a chance to hear the paper.

PROF. GEORGE F. SWAIN.—With reference to the protection of steel by concrete, foreign authorities claim, as is well known, that rusty steel or iron, if covered with concrete, will lose its rust and become bright. I should like to ask Professor Norton whether he has any experiments which substantiate this. In the East Boston tunnel the steel rods used were cleaned by the sand blast, it being considered best to be on the safe side. Perhaps this precaution was unnecessary.

PROFESSOR NORTON.—In answer to Professor Swain's question, I would say that, paradoxical as it may seem, with quite a number of specimens, which were coated with what would be called rust (not oxide, but rather hydrate of iron), or rather the beginning of rust, we found the specimens were cleaner after the experiment than before, and that they weighed a little less than when the concrete was put on. The action is small, because we had taken every precaution to treat them as harshly as possible. The weighings were made as carefully as could be done. I have been very chary about making statements on that point. The evidence certainly points to a real formation, on some of the heavier specimens of iron, free of iron hydrate or iron oxide. Whether this formation is of any use or not I do not know. It looks like a black smouch on the iron itself rather than a return to the structural material.

I had commenced to make one hundred or more slabs of cinder and stone concrete for one of the construction companies. The results of that investigation not being complete, we have not yet been able to publish it, but one of the things we did find out was that mixing the concrete just as wet as we could mix it, so wet that we had to put waxed paper on the bottom and sides of the mold, and then mixing it just as dry as we could mix it and tamping from above, so that the mixture was solid—that is, well together,—the one was gelatinous; you could have run a shovel in and cut a groove in it and it would return to its position; while the other was of such rigidity that if you stepped on it the imprint of your heel would remain in it; all were made and the slabs were broken. In the meantime we weighed some of the smaller pieces. We could not find out by breaking or weighing which was mixed wet and which was mixed dry. In breakage, the difference between wet and dry was less than 5 per cent, which was less than would be expected. Some were cinder-concrete and some were stone-concrete. They were of different

should I have got this done, when I know how to do much better?' 'I do not believe it. You may say what you please.' 'It is of no consequence to me. These hands can convince you.' 'I should like to see.' 'But many persons in Rome remember when I began and when I finished it, and I have the original model at Rome in my house.' In short, after repeated examinations he gave in, and said, 'You will leave England loaded with riches, and I will be the first to tell my friends that you are an extraordinary man.' The promise was not redeemed, and Payne Knight's conduct in the sequel was assuredly most unlike that of a man who loved truth better than his gems. Not choosing to confess himself in error, he challenged Pistrucci to model a similar subject differently treated; and when he found that the model was more beautiful than his so-called Flora, he went no more to see the engraver. The engraver accordingly went to him as soon as the model was ready, carrying with him a number of stones, none of which, however, satisfied Payne Knight, who in the end promised to send Pistrucci a stone. This was never done; and having further refused to unset the gem and convince himself that the Flora was a whole cameo, not a fragment, Payne Knight ended by describing it in the catalogue of his gems as a head of Proserpine, with a wreath, not of roses, but pomegranate flowers, and by asserting that the patina found on the gem clearly gave the lie to Pistrucci.—*The Architect*.

**DISCOVERIES AT OLBIA.**—Some highly interesting and valuable archaeological discoveries have been made on the site of the ancient Greek city Olbia. The site is situated on the southern bank of the Boug, about midway between Otchakoff and Nicolaieff, and not far distant from the estuary of the Dneiper. This ancient city was a colony of Miletus 655 B. C., and was a great centre for Greek trade with the interior. It is generally maintained among archaeological authorities that a trade route extended from Olbia across country to the northern sea, and when a find of ancient Greek coins was made, it was contended to be substantial proof of the fact. Recently, however, it was proved Getæ about 70 to 60 B. C., but it revived, and when it was that these coins were spurious. Olbia was destroyed by the visited by Dion Chrysostom, about 100 A. D., it was again a flourishing city. The excavations that are now in progress upon the site of this city are being carried out by M. Formakovski under the auspices of the Russian Archaeological Society. Mr. Formakovski has succeeded in unearthing extensive portions of the walls and foundations of the original city, which date back from the seventh century B. C. The masonry is identical with that of the ruins of ancient cities excavated in various parts of Greece. Before this depth was reached, two different strata of walls and basements bearing descriptions of the fourth and first centuries B. C. were encountered. The stone blocks composing the ruins of houses, temples, etc., in these upper strata are of remarkably exact area, square proportions, and excellently dressed. The more solid constructive work is, however, found in the remains of the original city. At this depth there was unearthed a perfectly preserved wine cellar. Some fifty huge jars or vases had evidently contained red wine, now turned to a light powdery substance. A large collection of valuable antiques in gold, marble and ancient pottery has also been found in these newly uncovered ruins. These have been dispatched to the Hermitage at St. Petersburg. M. Formakovski, however, is carefully examining every antique unearthed, to establish its genuine character, as it was on this site that the spurious tiara of Saitapharnes, now in the Louvre, was alleged to have been discovered.—*The Scientific American*.

**ADAB, AN ANCIENT CITY.**—Udnunki, the ancient Adab, perhaps the oldest city in the world, has been discovered by the University of Chicago's excavating expedition in Babylonia. This city has for many years been the object of search by Orient-lists. It is mentioned in the code of Hammurabi, an early king of Babylonia, which document was translated recently by Professor Robert F. Harper, director of the expedition. He has just received news in a cablegram from Professor E. J. Banks, field director of the expedition, who since leaving this country last winter for Bismaya, in Babylonia, has announced many important discoveries. The uncovering of ancient Adab is one of the most important archaeological achievements of recent years. Dr. Banks informed Professor Harper that he had found bricks bearing the syllables Ud-nun-ki at the lowest level of the ruins. He is certain that these bricks identify the city as Adab. With a force of 120 men he excavated the ruins at Bismaya and found the remains of four temples, built one above the other, which he named according to the kings who built them. The dates become earlier until finally the bricks identifying Udnunki were found. Among other articles which Dr. Banks found are marble statues, onyx and sandstone lamps and many bronze objects.—*Exchange*.

**THE LARGEST WIRELESS STATION.**—The largest station for wireless telegraphy is being erected near Pisa, Italy. On its completion, by the end of this year, it is expected to afford direct communication with all countries of Europe, as well as the United

States and Canada, and with all vessels on the Mediterranean, Indian and Atlantic Oceans.—*N. Y. Evening Post*.

**MEASURING PRESSURE OF WIND.**—Some very interesting experiments upon the resistance of the air have been recently made by M. G. Eiffel at the tower which bears his name, by means of an apparatus of his invention which may be daily seen in operation when the air is calm. At a given signal a cylinder, carried by a double spring, falls with great velocity from the second floor of the tower (that is to say, from a height of about 375 feet), along a vertical cable, and then progressively slows up, and stops without any shock at 3.28 feet from the ground, remaining attached to the cable. This cylinder, a part of which is conical, carries in front a plate which is thrust backward by the pressure of the wind during the fall. Such displacements compress an accurately tared spring which measures the pressure and inscribes it upon a registering drum, the revolution of which is regulated by the fall itself. The ordinary inscribing style is replaced by a tuning-fork that makes a hundred vibrations a second. When the apparatus is opened there is, therefore, found inscribed upon the drum an undulating curve that gives for every point the height of fall, the pressure acting at this moment and the velocity, within an approximation of a hundredth of a second. This is the first time that one and the same apparatus has continually indicated these various results from the zero velocity to that of 130 feet a second, which is that of the most violent winds. As the pressure device may be of any form and size whatever (a normal or oblique plane, a cone, sphere or cylinder), the apparatus is capable of giving more accurate results than have hitherto been obtained in experiments on the resistance that the air offers to a moving body, and which is nothing else than the pressure of the wind upon a stationary body. Such determination presents great practical interest, either as regards the utilization of the pressure of the wind as a motor or the resisting of it, as becomes necessary in the practice of the profession of the engineer and in experiments with dirigible balloons. In order to complete the description of the apparatus the principle of which has just been indicated, it suffices to add that in order to diminish the effect of the velocity of this mass of 265 pounds, moving at the rate of 130 feet a second, say nearly ninety miles an hour, the frame of the apparatus is carried by a very powerful double spring, which slides freely along the cable as far as to within sixty-five feet of the ground, at which point the diameter of the cable progressively widens and the double spring also is forced to widen, and then exerts a pressure upon the cable, and through its friction gradually diminishes the velocity. The experiments have shown that the pressure of the wind is notably less than that admitted up to the present. After they have been finished this question, which has hitherto been very uncertain, will have made important progress and have demonstrated once again the services that the Eiffel tower is capable of rendering to science.—*Scientific American*.

**TREES PLANTED AT NIGHT.**—It was long since observed that budding trees, when transplanted in the evening and immediately and copiously watered, were much more likely to thrive than those that had been moved in the day. But this knowledge did not lead to any well-defined theory on the subject until the experiments of M. René Rounault, a French expert, proved beyond a doubt that distinctly beneficial results could be gained by transplanting wholly at night. Being called upon to transplant a large tract toward the end of May, 1903, M. Rounault determined to work at night, and in order to be sure that he made no mistake he transplanted a Holland linden, which had been in his own nursery for five years, at 10 o'clock at night. He carefully watered the tree, and the branches which bore buds were freely moistened. The linden did not appear to suffer from this transplanting, and continued to grow normally, without showing any signs of weakness. Encouraged by this success, M. Rounault performed the work of transplantation entirely in the night time. The results were excellent, only two trees dying, though the choice of the species was extremely wide, containing many which do not readily submit to the process of transplantation. With reference to the precautions to be observed, it should be stated that trees should not be transplanted while their buds are too tender, and that the work should be done between 10 o'clock p. m. and 2 o'clock a. m. It is desirable that the roots should be covered with earth which has for several days been exposed to the effects of air and light. This should be settled by copious watering, which forces the earth between the roots, and not by pressure with the feet. For the first fifteen days after transplanting the boughs and leaves of the trees should be abundantly sprinkled.—*Philadelphia Record*.

**STATUS OF CEMENT INDUSTRY.**—A report on the cement industry in the United States for the calendar year 1903 issued by the United States Geological Survey says the total production of Portland, natural rock, and slag, or pozzuolana cements amounted to 28,454,140 barrels, valued at \$30,364,341. This was an increase of 2,700,636 barrels over the preceding year. The aggregate embraces 20,897,973 barrels of Portland cement, valued at \$20,146,319; 7,030,271 barrels of natural rock cement, value \$3,675,520; and 525,896 barrels of slag cement, value \$542,502.



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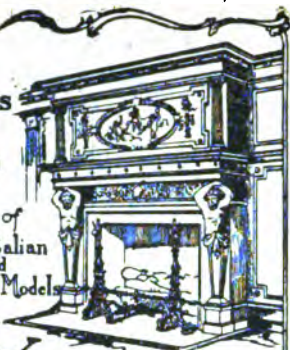
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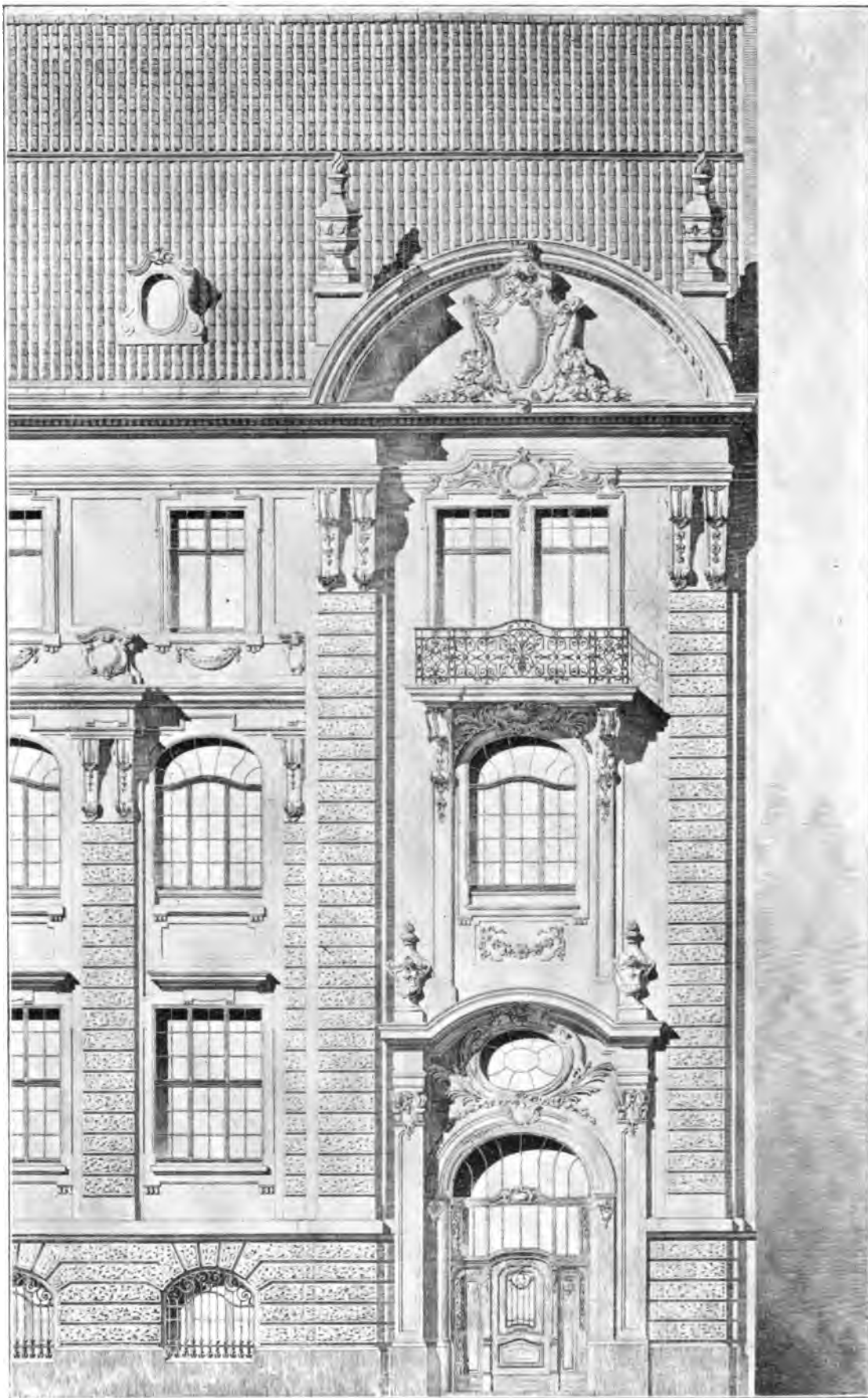




***The Royal Maritime Exchange, Berlin, Prussia.  
P. Kerschke, Architect.***

*From Zeitschrift für Bauwesen.*

*The American Architect,  
August 20, 1904  
No. 1495*



**Detail: Royal Maritime Exchange, Berlin, Prussia.**  
*P. Kleschke, Architect.*





# THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. LXXXV

SATURDAY, AUGUST 20, 1904

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**T**HERE is many a man who would feel he deserved his Maker's "well done," could he but claim to have done a small portion of the praiseworthy things that Samuel Putnam Avery, who died last week at the age of eighty-two, took so much pleasure in doing for his fellow-men, for their enlightening and their uplifting. His humanitarianism was indicated by his taking part in the Civil War as a member of the Twenty-third Regiment, N. Y. Volunteers, and his later efforts to help forward the education not only of the Negro but of the Indian as well, and by his interest in charitable undertakings of sundry kinds throughout his lifetime. His most beneficent endeavors, however, since into them was thrown the strength of a real personal interest, turned in the direction of stimulating and directing the growing interest of his fellow-citizens in New York in matters of art. In this field his development was interesting and natural. Beginning life as an engraver on wood and copper, while yet a mere youth, it was but natural that he should develop as a publisher of prints. Selected as one of the United States Commissioners to the Paris Exhibition of 1867, he was able to make the beginnings of a large acquaintanceship with foreign artists, and on his return to New York he opened a picture-dealing gallery, which grew to be one of the most famous in the country and proved the means of accumulating a large property for himself, so that at the age of sixty-three he was able to retire from business, but not to a life of idleness, for he was active in the forwarding of his selected interests up to the day of his death. These interests lay mainly along the pathway of the arts, and it was through his position as a director in the Metropolitan Museum of Arts that he was able to render such good service to his fellow-citizens, not only through ungrudging expenditure of his own time and special gifts to the collections, but still more through his being able to influence others to give or bequeath collections of value which are making the New York museum one of the great institutions of the kind. Being also a trustee of the Lenox Library and the New York Public Library, these institutions, also, benefited by his foster-

ing care, particularly the former, whose collection of prints he greatly enhanced. His most significant undertaking, one in which his wife joined him, was the founding and endowing of the valuable Avery Architectural Library at Columbia University, in memory of his second son, an architect educated at the École des Beaux-Arts. This collection, unquestionably the largest and most complete in this country, and probably one of the largest in the world, is a great boon to the profession in New York, since it is managed under singularly liberal regulations, and the profession at large has made what acknowledgment it could by making Mr. and Mrs. Avery Honorary Members of the American Institute of Architects. These enlightened parents also made the memory of a daughter, a teacher, more lasting, by establishing a memorial library in connection with the Teachers' College, now an annex of Columbia University. In these ways and through his aiding and guiding amateurs in the formation of private collections of paintings and through his activities on the art committees of such clubs as the Grolier, the Players', the Union League and the National Arts, Mr. Avery exerted a very wide influence in the education of the last two generations of New Yorkers in matters of art.

**T**HE latest move in the latest labor-union trouble that has arisen in New York is a most unexpected one and one which would seem to offer much encouragement, but for the unfortunate facility with which Labor abrogates all its agreements and treaties and refuses to be restrained by the bonds that fetter Capital and that greater *tertium quid* that is neither Capital nor Labor. When Labor appeals to the Law, it looks as if it might be willing to give up its residence in the realm of unreason and return to the way of life that is governed by law, logic and reason; but, as we say, it is quite impossible to know what Labor will actually consent to as a permanent condition. The Building Trades Alliance has just entered suit under the anti-trust law against the Building Trades Employers' Association as a body organized to effect a restraint of trade, and this appeal to the law is, as we say, interesting, and it possibly may be encouraging. It seems to us, however, a case of the pot and the kettle, for we cannot conceive of any argument that can be brought against the employers that cannot be brought with equal justice against the unions, and as the law compels a pleader to come into court with clean hands, and as the hands of the union men are unclean with underhand methods and with human blood, it would seem as if their plea might run a very good chance of being thrown out of court.

**D**OUBTLESS the Building Trades Employers' Association, one of whose strong cards it is just now to declare for the "open shop," will be more than ever inclined to play it, because the long strike of carpenters at Springfield, Mass., which was declared off last week, has resulted in such a pronounced victory for the master-builders of that city and has assured

to them the advantages of the open shop. This strike, which lasted for fourteen weeks and seriously interfered with the building industries not only of Springfield but of all central Massachusetts, was peculiar in that although the strikers frequently invited their employers to meet them in conference the invitation was always ignored, the employers holding that their striking workmen had no further claim upon or interest in their former positions; that is, simply, they consistently refused to recognize the latest trade-union doctrine that a union man has "a right to his job," whether it is his pleasure to do the job or leave it undone while he is supported in idleness by strike benefits exacted from other union men willing for the nonce to accept wages. The Springfield carpenters have lost every point they contended for, have sacrificed the best part of the building season and have after all only established the open shop.

THE logical but not the natural outcome of the labor-union movement is to bring all the unions together into one vast central and nearly omnipotent body. This is the logical outcome but, considering the average intellectual standard of the laboring man, it is fortunate that the universal foibles of mankind stand in the way of its being the natural outcome. It is testimony to the importance of the building industries in this country that the first effort at the creation of a central body of the first importance should be made by the building trades. This body which is to be known as the Structural Building Trades Alliance of America has been germinating for a couple of years and the third meeting of the organizers was held at Indianapolis this month. The nine organizations, which have a total membership of nearly a million, that are already affiliated are the International Bricklayers and Masons; Brotherhood of Carpenters and Joiners; Operative Plasterers; Brotherhood of Painters and Decorators; Journeymen Plumbers; Steam and Gas Fitters; International Stationary Engineers; Bridge and Structural Ironworkers; Brotherhood of Electrical Workers, and International Hod-carriers and Building Laborers. Any congregation of a million men, so long as they consent to work together, can accomplish a great deal that is good or a greater amount of evil. Fortunately the present body, or rather the body's present leaders, seem to be well-intentioned men, as there is certainly to be found much that is deserving of praise in the following declaration of principles as stated in the Association's constitution:

The establishment of local and international boards of arbitration to settle disputes as they arise without having resort to strikes.

When necessary to give international sympathetic support to all trades affiliated, where local boards fail in their efforts to adjust difficulties.

To safeguard, protect and watch over the interests of the organizations affiliated.

To protect the autonomy of the several trades represented.

To keep agreements with employers inviolate.

To avoid and discourage strikes and to prevent international strife and friction in the building trades industry by substituting arbitration in settlement of trade disputes.

To oppose the formation of dual and rival bodies; to demand their complete annihilation and assist only such unions as are affiliated with their respective national or international unions conforming to this declaration of principles.

To encourage and maintain fraternal relations with existing recognized central bodies and to emphasize the necessity of a centralization of organized wage-earners.

THE New York newspapers are doing their best to make it appear that Mr. Hopper, the Superintendent of Buildings, has only a sinister motive in asking for an additional one hundred thousand dollars to expend on his pay-roll. It seems to us, however, that they do not give enough weight to the fact that the inspection of building operations in the past has been woefully ineffective, and that it is a matter of common knowledge that it would be impossible for the present number of inspectors, even if they were the very best obtainable, to give proper inspection to the vast amount of work that is done at such great speed. It is true that before his appointment Mr. Hooper was a Tammany district-leader, but it is also true that he was a successful and competent contractor for masonry work, and it is just as true that the present Tammany administration is making a singularly good record for itself in nearly all departments of municipal work. Fifty-four new men are to be employed, most of them inspectors, and their proper wages must consume the greater part of the new appropriation, and so there cannot remain a larger fraction of it than can be used, as is alleged, in improperly increasing the pay of the present force of inspectors, some of whom certainly are efficient enough to deserve any increase of pay that may come to them.

IT gives one a thrill of real pleasure each time that the supremacy of the law over incidental expediences is asserted. The Westminster Chambers case was a very interesting instance of the final triumph of the law, but that is as nothing to the spectacular decision of the House of Lords, which, being based on fundamental law and disregarding the injury and injustice the decision does to great vested interests, has recently thrown into confusion the entire Presbyterian Church of Scotland, depriving, as it does, the majority of the membership of all their right to and title in the churches, manse and other buildings, as well as to the invested funds they have hitherto held, and bestowing these on the minority, a score of poor parishes in the Highlands. That these Highlanders should profit in the amount of some twenty million dollars' worth of property because they had remained true to the principles of the establishment of their church and the doctrine of predestination is interesting enough, but not so noteworthy as that there should be judges capable of doing a great wrong for the sake of upholding an abstract right.

IT is very galling at times to have to follow one's own advice or to swallow the medicine prepared for another patient, so no good American can wonder that our newspaper writers are writhing in indignation at the audacity of the Canadian Government in ordering the deportation of certain civil engineers holding important positions in the work of constructing the new Canadian transcontinental railroad, the Grand Trunk Pacific. What right has Canada, or any other country, to protect its citizens by enacting an "alien contract labor law"? Is not that one of our own most precious inventions, and can't we do something to prevent an infringement of our rights in it? One is sometimes tempted to believe that Americans nowadays are a bit too strenuous to be wholly satisfactory occupants of this world.

## THE ENGINEER, THE ARCHITECT, AND THE GENERAL CONSTRUCTION COMPANY.

WITH the permission of the editors and the assent of the writer, we are glad to be able to lay before our readers a paper by Mr. Reginald Pelham Bolton, C. E., which appeared in the August issue of the *Engineering Magazine*.

The proper relation of the architect to the engineer, always a matter of discussion, has become more and more delicate because of the increasing complication of modern buildings and building methods, which compel more than ever the members of the two professions to be associated closely in the carrying on of the same structural undertaking. Discussion of these complexities is usually confined to members of the same profession, and it is not often that the views of architects are laid before engineers or *vice versa*, and we have thought it might be advantageous and perhaps excite a public discussion, to which we should be glad to open our own columns, if we placed Mr. Bolton's paper where it would be seen by a great number of architects who do not read the *Engineering Magazine*:—

THE architectural profession has not infrequently recognized its responsibility for the results of its professional work, and has advanced in many ways along lines of modern development. But it has curiously failed to recognize its responsibility in another and more important respect, namely, that of the acceptance of fees in payment for certain technical and artistic work which its members are not qualified by training to execute, and in which they are not expert in the same sense as they are in connection with actual building design. The position occupied by the profession in this regard is not logical, and has brought about a very disastrous state of affairs as regards their employment in the largest building enterprises.

As the logical reason for the employment of professional ability in the design of a building, in place of the employment of contractors or builders for the purpose, it is maintained by the profession that their members are a trained body, expert in the design and proper construction of the work they undertake to plan, uninfluenced by the considerations which affect the contractor or builder, and capable of giving economical and independent advice to their clients.

The client, it therefore follows, in employing an architect, engages and pays for a personal ability and technical knowledge of the subjects under consideration and is entitled to a receipt of that personal capacity and technical information in each branch dealt with.

If, therefore, the architect does not possess expert knowledge on any one branch of his undertaking—and no one can expect that any one of that wide profession should be so fully informed—he is under moral obligation to supplement his own deficiency in respect of any particular item involved—such as, say, sculpture, modelling, decorative effects, landscape gardening, sanitation, boiler practice, chimney design, electrical equipment, heating, ventilating, hydrostatic, elevator, foundation, steel construction, or other modern requirements—by the equivalent expert and equally independent knowledge of others; otherwise he is not giving his client value for his engagements.

In other words, architects are paid for professional knowledge and experience upon all parts of the work they undertake, and cannot honestly accept pay for their services as amateur sculptors, artists, engineers, plumbers, and for amateur opinions upon technical subjects. Yet too many of them not only do so, but still adhere to the old practice of obtaining information, guidance, proportions, even their plans and specifications, from contractors and prospective bidders.

As regards engineering work, there are a few architects who by reason of a certain amount of habitude, possibly in some cases of a certain amount of training, possess a familiarity with some sanitary and engineering matters. But would they, if deprived of their architectural practice, undertake with that amount of knowledge to enter upon independent practice as experts in those lines?

In other words, will any architect assert himself to be as fully qualified in these matters as he professes to be, and is, in building design and construction?

Recognizing the necessity of doing something, but desirous of avoiding the cost of employment of ability of a character and cost equal to their own, a number of architects have proceeded to a course which has proved peculiarly adverse to the interests and credit of the profession. They hire inadequate and often inexperienced help in the shape of assistants or draughtsmen, and

put them forward as their substitute for technically trained expert assistance. One of the foremost firms of architects in the United States have in their employment, and put forward as their "consulting engineer," a very worthy, and in his own line deserving, man whom they took out of an engine-room. There are several others who pay their "consulting engineers" in their office from \$20 to \$30 per week, and permit this class of experience to pass upon and decide the important operating expenses of their clients. Such men are not only incompetent in the direction of knowledge, experience, or ability, but an injury is inflicted upon the client which often reflects back upon the architects, by placing such a class of men in control of matters where large sums of money and many competing and unscrupulous interests are engaged.

The very essence of the employment of professional men is that their "standing" shall protect the employer from corruption and undue influence; and in passing over any part of their engagement to a lower class of employed and often under-paid labor, the architects very seriously compromise their employer's interests. Even when an independent engineer is employed he is often made to feel that he is only the agent of the architect or is placed under obligations to make his designs coincide with the architect's views. The results are to be seen in many otherwise well-considered installations.

There are eight hundred and fifty practising architects in New York, and there are seventeen independent consulting engineers employed on such cognatic work, where there should be plenty of inducements and work for ten times the number. The architectural profession have had this matter drawn to their attention by several engineering societies, and have not only failed to correct their false position, but have embodied it in the provisions of their form of professional contract. As their self-sufficiency evidently renders them deaf to the calls of plain dealing, it is necessary to direct the attention of those who employ them to the matter, so that the existing system may perhaps be remedied from without. I shall not lay myself open to any charge of one-sidedness, but freely admit that there are some engineers posing as architects to whom the same consideration can be inversely addressed. But it is to the general credit of my profession that they are an extremely limited number.

It is in connection especially with steam apparatus that this matter assumes peculiar proportions, for in this the owner's pocket is particularly and permanently assailed. If a few personally conducted parties of steam users could be taken through some of the most modern fire-rooms in New York they would certainly be convinced of the desirability of employing engineers on engineering work. A trip up Broadway would reveal boilers in dark and stifling sidewalk vaults which are a menace to public security, since boilers so placed cannot be properly maintained in security; boilers far away from the chimney, necessitating horizontal smoke connections, in one case 225 feet long; boilers, as in one well-known and widely illustrated building, so badly placed and connected that when steam is raised in one the expansion pulls the piping off the other, or, as in one of the largest insurance buildings, placed in the same room as the machinery, with space for only one day's fuel. Such instances could be multiplied.

Owners are of course largely to blame. But they do not realize what the position is. The mechanical plant in a large office-building is worth from \$60,000 to \$150,000. On this an architect commonly receives his commission of 2½ or 5 per cent, or from \$1,500 to as much as \$7,500. His outlay in respect of its design is frequently nothing, the whole being obtained from contractors.

The steel structure may be competed for by more than one firm of contractors, but each maintains its own drawing-office, sometimes employing as many as 100 to 150 draughtsmen, the cost of which labor is added to the price; and thus the planning of this part of the work is frequently paid for by the owner of the building twice over.

*The Building-Construction Company.*—The unsatisfactory conditions of service, as offered by the majority of the architectural profession, have led to the introduction of a recent development of the pretensions of the builder to the possession of the facilities of the architect, and for this development, directly hostile as it is to their own pretensions, the architectural profession have themselves, in their persistence in the foregoing practices, entirely to blame. I state this fact from personal knowledge of the reasons which induced the introduction in New York of the present system of general construction, the foregoing conduct of the architectural profession having been given to me as the cause by two of the leading concerns against whom the architects of New York are now loudest in their denunciations.

By dint of liberal assertion, of active exertion on the part of young and alert employés, and of constant iteration of architectural shortcomings, the construction companies have plucked the ripest plums from the building orchard. They have calmly adopted the plans of architects, without credit or thanks, have walked off with their clients, belittled their abilities, thrown doubt on their capacity, sneered at their rectitude, and cold-shouldered their approaches to any understanding.

Their particular facility is that they, for a covering figure, can carry out all architectural detail and engineering work without cost and with their own trained staff. This would be an excellent idea, if the staff were of that character; but in point of fact, they have not yet grasped the fact that it would pay them to employ the highest class of professional ability; and therefore the men employed by them in the work of design are often either small contractors, or are assistants of the same order as those to whom I have referred as being employed by some of the architectural profession. If the scope of these powerful concerns should eventually fully cover the field of building operations, the profession of architecture would be very completely visited for its shortcomings, since the avowed idea of the construction company is to allow the architects no more than the opportunity of producing general designs to be by them detailed and developed; but so far, owing to the very similar class of intelligence applied to their work of detail design, the result has often been poor architecture and, more often still, poorer engineering.

In respect to the latter, I regret to say that since the operations of these construction companies began, no advance whatever has been made in the improvement of the interior engineering of the buildings they have handled. In point of fact, their practice at present is the installation of poorer designs of mechanical equipment than were generally discredited before their methods obtained an ascendancy in modern building operations.

It is but a natural result of such a system that this should be the case. A general contract for a great building is made on a condition which is the essential feature and object of the employment of a general contractor. It is that a building of a certain character, often identified only by a mere sketch or outline, or even by a partial reference to some existing building of a more or less similar type, shall be erected within a certain period for a certain sum, without any extra charges. Any attempt to introduce any detail of conveniences, of desirable materials, or of particular requirements, is met and combatted by the objection that the builder must have a free hand in selection or in dealing with competing manufacturers; otherwise the cost will be increased, or the time limit will be exceeded, or labor trouble may ensue. So the owner signs away his money and gets in return a complete structure, it is true, such as his picture showed, which is, however, built of the material, equipped with the class of apparatus, proportioned to the extent of liberality, and constructed by the class of labor, which have best suited the policy or profit of the contractor. If by the inducement of the needs of this building a gain can be made in another; if by the sacrifice of a detail in one an extra can be avoided in another; if by diverting proper labor from one, less competent or cheaper labor can be utilized in another—then these policies are open to adoption, are liable to be adopted, and are and have been in many cases adopted.

As to the designing work produced under this system, it is inferior and is done by inferior help, whose efforts are subordinated to the one predominating consideration of avoiding all avoidable cost, while at the same time evading the much-abused "extra," which in this class of contract, coming directly on the construction company, is of course to be avoided at all cost of sacrifice of efficiency. I will give an instance of an actual occurrence:—

In the construction of one such building it was discovered that by a blunder in reading, or more likely by an error in estimating, no provision had been made for the cost of carrying the decorative "effects" of the two outer sides of the building round its interior sides, which were exposed by the ownership of the abutting property. The difficulty was overcome by directing the engineer to cut down the equipment to a sufficient extent to pay for the deficiency.

The proper equipment was, therefore, cut from two boilers of ample capacity and one spare, to two boilers which, when forced, can just do the work; two generators which unitedly will barely carry 5-10 of the total lighting load, and 6-10 only by overload; the omission of every possible convenience and cross-connection; the reduction of the plumbing and character of the fixtures; and the skinning of the heating arrangements down to the cheapest

system. The owners have the satisfaction of knowing that their building is carried out "without extra," and has cornices of the anticipated appearance. But they do not know that they have not only paid an extra in full for the work, but also are paying an extravagant and permanent interest on the achievement, in their coal, repair, and labor bills.

*The Owner of Property.*—I could multiply these instances, but I do not know if there is any good in attempting to draw beneficial lessons for the education of an educated class which is, withal, too careless or incapable to take elementary precautions as to its own rights and property. One would suppose that a most limited intelligence would enable a property owner to perceive that he is not likely to get something for nothing out of a smart firm of general contractors.

As regards the features of engineering character in their buildings, it might naturally be assumed that men of business capacity and of ordinary intelligence would, in a matter in which they are directly and permanently liable for the cost of results, very closely examine into the conditions surrounding their future outgoings, with the aid of the best technical knowledge available. But that is rarely the case. Such people, when contemplating the construction of a building, are captivated by the ideas of outside design and interior decoration, and are under those influences to such an extent that the hard and mechanical details of engineering operations are uninteresting to them. They are also very frequently dependent in all such matters on some mechanic in their employment, such as the operating engineer or fireman in their own home or other property. These men, when put forward (as they very frequently are) to discuss or suggest or even to proportion necessary apparatus in a new building, do so with the natural subserviency of their class, and come under the architect's or contractor's dominance, their employment in this manner often resulting in worse blunders than would have been the case without their limited ideas, and their liability to accept all kinds of assertions on the part of manufacturers.

Not until it is much more widely understood that the mechanical apparatus in a building is the part of it that directly affects the pocket of the owner, that in it and by it he is constantly being defrauded and fleeced, will the present state of affairs be amended.

I have recently had the opportunity of laying these views before one of the great mortgage-insurance companies, whose action will in future take into account the imperfections and deficiencies of mechanical apparatus in the building in which they take an interest. It may be that others will awake to this, to them, important element, and that through their action careless ownership will be aroused.

Having sat for ten years past between these elements, and having had the good fortune not to fall into the evil graces of either, I am in hopes that my plain speaking will be taken in good part and that all parties will proceed to set their courses with a little more regard for their true interests in this age of engineering detail. And I am thankful to record my knowledge that there are architects who fully live up to their undertakings in the respects I have named, as there are builders who are conscientious, and as there are owners who are capable of appreciating the value of the old saw—"Every man to his trade."

#### COÖPERATION OF THE ARCHITECT AND ENGINEER.

**I**N connection with the foregoing paper, it seems worth while to publish also the following editorial which recently appeared in *Building News*:

INDUSTRIAL and municipal developments that have lately come into notice, and forced their demands on the architect's attention, have rather altered the relations between architecture and engineering. Before these developments occupied attention the two professions worked side by side, each in his own groove, without any interference. Each had his own separate work, and probably the only kind of building or construction for which both put in a claim was the construction of bridges and railway stations. With regard to bridge-building, indeed, the engineer has had his own way since, at least, the construction of railways, which gave an impetus to bridge-construction, though the engineer's exclusive right to this class of structure has always been disputed. In the erection of large terminus stations for our great lines of railway, the engineer has generally been associated with an architect in the external design. At least we know several of our large terminal stations have been designed by architects, from



that of Southampton, one of the first we believe, designed by the late Sir William Tite, to those of the Northwestern at Euston, and the Midland at St. Pancras, the latter being, as all our readers know, by the late Sir Gilbert Scott, who was also the architect of the hotel in front. Since the railway era, various kinds of building for utilitarian purposes have sprung into existence. The development of water supply for our large towns has necessitated the erection of engine houses for pumping, and the various requirements in connection with sewage and utilization schemes have in like manner called for the design of buildings for pumping-stations and boiler-houses. Workshops, factories, power-stations for electrical plant have quite recently added greatly to the possible development of the architect's functions. We owe this transference of buildings constructed for engineering purposes to the progress of specialism. The engineer is now so entirely occupied with the design of the mechanical arrangements and plant, that he has less time to devote himself to architectural design, and to this extent the architect has been more brought into requisition. Thus the relation between the two professions has been altered. A readjustment of the relation has become necessary. On one side the line of demarcation limiting the engineer's from the architect's work has become stronger, while the latter's knowledge of engineering arrangements is practically an extension. He must at least have an intelligent and general knowledge of the requirements of pumping and machinery equipments and electricity before he can grasp the conditions of the problem. The engineer may, and often does, assist him in the general plan; but he ought to be so far a master of the requirements as to have a free hand in the design, to be able to advise on possible modifications of plan and structure, which he could not do if he wholly depended on the engineer's instructions, and this independence has brought about a more perfect coöperation between the professions than had previously been possible. For instance, it was usual when a railway-station or bridge was contemplated for the engineer to consult the architect about the elevation. The plan and structural arrangements were completed before the architect was called in—a proceeding which resulted naturally in a case of two cooks spoiling the broth. Between them both the work became a failure. The engineering requirements trespassed on the plan, in the section, in the elevation, and the architect submitted to the demands, and in a half-hearted way designed something that he could not admire. We have only to look at the buildings of an engineering kind—our railway-stations, factories, pumping-stations, and engine-houses to discover the unworthy compromise between so-called utility and art. Unfortunately those who were called in to make designs for such works, instead of attempting to suggest a better way, gave up in despair, or introduced ornamental features of doubtful meaning to conceal what was thought to be unsightly. We see, for instance, gable ends of engine-houses enriched by questionable details, and power-stations embellished by Gothic screens, in which large traceried windows appear, expedients introduced to mask the naked baldness of the structure within. Factory and engine-house and power-station are frequently adorned by chimney shafts representing Italian campanili. The Tower Bridge is another example of architectural engineering in which fourteenth-century gateways and machicolated towers of fortress-like character of thin stone form the external casings of the steel framework for the chains which raise and let down the bascules of the centre span. These are a few illustrations of the questionable mode of using architectural design to conceal the real structure in the absence of a better understanding between the engineer and designer. They are standing witnesses of the transition from structural engineering to the architectural solution. Our railway bridges and viaducts across our public streets still offend the eye by their extreme harshness and unsightly appearance. Where anything has been done to render them ornamental, as in the railway viaduct at Ludgate Hill, it is by concealing the only structural part, the main girders, which carry the railway track, rather than by boldly designing them on more artistic lines. The same remark applies to many of our modern bridges across the Thames. Blackfriars and Westminster Bridges, and the proposed Lambeth Bridge afford instances of iron and steel structures in which the engineer's design has been accepted, and an ornamental screen-work or spandrel facing designed to give a sort of architectural character to the structure. The first named is at least a more honest attempt than the second, as the segmental arched ribs are externally shown. The claim of steel over masonry or granite for bridges which have a steep rise or gradient is, no doubt, a strong one, which the engineer cannot disregard; but why should not the

architect be consulted to assist the engineer in the design? Probably because the architect is supposed to be less acquainted with steel construction, or that his proposals will be of too radical a kind to be considered practical or moderate in cost. The design of the external spandrels may be left to him, and this is all that the engineer or his employers are prepared to do. The remedy for this state of things is not likely to be found till the committees intrusted with works of this kind invite architects to submit designs. There are surely men to be found in the profession who are quite capable of applying their art to steel-work. The possibilities of steel-concrete construction are great, and what has been done in smaller works can be taken as a guide. A good deal may be argued on each side. Professional men, and especially artists, do not care about sharing the credit of unimportant work. It is, perhaps, not unnatural that the engineer or designer of a bridge does not like the architect to come in and take the most attractive part of the design—the elevation. It is the outward appearance of a thing which appeals to the public taste and favor. The architect gets at least this share of the work, small and unimportant though it may be. On this point we have something to say. He ought not to feel satisfied with following the engineer's lines and curves of his steel-construction—designing piers, spandrels, and balustrading. When the architect has or experiences this compunction, that the credit due to him is for a very subordinate part, and that he can claim no share in the real structural design of the work, whatever it may be, there may be some hope of an amendment, and it will be a healthful sign of an awakening from a false position. No conscientious architect can honestly believe in "decorated construction," or of becoming a decorator of engineering work; he cannot honestly say that he is a part-author of the design, unless he has taken a share in the initial conception of the bridge or other work, and the main constructive parts of which it is composed. The design of a river bridge involves various considerations: pier construction, waterway, gradient, span, the best form of girder or arched rib, the loads under varying conditions. Piers must be proportioned to the foundations, to kind of girder, and the thrust, height above river level, and other things. All these factors have to determine the general design; other decorative effects are subsidiary to it. To take this view of engineering design the architectural profession have something to learn. They must be able to place themselves in the position of the engineer, to anticipate the difficulties of steel or masonry construction, and the various conditions of the building; and this point of view has not been taken. The relation between engineers and architects has been rather one of antagonism. The former has regarded the architect's ideas as chimerical or impracticable, as based on imperfect knowledge and experience of iron and steel; while the architect has looked upon the engineer's work as crude and inartistic, based on mathematical theories and formulas which leave much unsatisfied, and which seldom give any sense of pleasure. These antagonistic opinions have, of course, prevented any *entente cordiale* between the professions, and have rather widened the gulf which separates them. While regarding each other from such opposite standpoints, we cannot wonder that differences have been magnified, and that any agreement between them has been rendered more difficult of accomplishment.

When on one side it is argued that an engineer is the only qualified person to design a bridge or a structure used for engineering purposes; and on the other side it is argued that without an architectural training no engineer can build such a structure that will be satisfactory, it is impossible to come to any mutual terms which underlie or are common to both professions. On the engineer's part, a great deal of his prejudice against art or æsthetic principles is derived from the early instruction of the civil engineer. He learned only partial truths from his master and at school. For example, all held half a century ago to the atomic theory, and anyone who doubted its truth was considered ignorant, as Sir Guilford Molesworth, in his inaugural address at the City Guilds Central Technical College, said last year; but he reminded his hearers that Professor Huxley years afterwards had declared that these molecules or atoms were "creations of the imagination and pure assumptions." Neither have chemical facts proved the truth of that theory. In like manner, a great deal of the engineer's early education and training in construction has been proved to be defective. The principles of bridge construction have undergone considerable modifications. Cast-iron, so often used in the earlier railway bridges, was first believed to be a safe material; but much has since been learned about the tensile and compressive strengths of cast-iron, its chemical composition, etc. Professor Unwin has shown that the

tensile tests give better indications of the quality of the material for structural purposes than the compressive tests, which were at first considered sufficient. Since the establishment of the engineering laboratory in our technical schools, and the experiments made with testing-machines, the qualities of iron and steel and their use in construction have been developed to a degree which has rendered new ideas of design possible. In short, engineering speculation and science cannot lay down or enunciate a code of rules on design, for new materials and methods are always being introduced. With steel construction we seem to have reached a point where æsthetic considerations have no common ground; nothing appears at first sight to be more utterly at variance than steel and artistic treatment. What can the architect do with a steel truss or roof—its members are so light and thin? The most economical distribution of the metal in ties and struts has not been favorable to artistic designers. But who could have foretold that steel could be employed to strengthen and reinforce concrete, and could be shaped to almost every requirement? So from the strictly engineering side of the question not very much can be expected to bring about a reconciliation between the professions. The engineer moves in a hand-to-mouth way;—where a new material is found or method introduced it is immediately turned to account in the most direct way without consulting the architect; he resists all improvements till another new material is forced upon his attention. On the architect's side there is a reluctance to use the engineer's type, but there is prejudice also on his part. He will not take the trouble to consider the question from the engineer's point of view. He will not make himself acquainted with the new material, but allows it to be employed by the engineer till it is too late to suggest any modification. From scientific analysis, tests of material, he keeps aloof; yet from such an independent standpoint he is apt to condemn all that the engineer has done. No doubt he has good ground for his protests, when he sees engineering structures costing fabulous sums, so utterly crude and unsightly, so opposed to all art sense. Yet he has made no attempt. On each side there has been prejudice. The only hope of better relations being established is for each profession to try to begin to understand each other's position. The time has arrived for a *rapprochement*. The installation of electric lighting and tramways, the design of power-stations, and other structures requiring engineering skill, has made it more incumbent on the architect to master these questions. In his instructive paper he read some time ago, on the "Design and Construction of Electric-Generating Stations," at the Institute, Mr. Stanley Peach pointed out that coöperation of the two professions of building and mechanical engineering is necessary. The latter profession is of the most complex nature, and from the very beginning electric-supply engineers have been too busy on the working-out and perfecting of the many devices and details of the various systems of the subject to spend any time or thought in the consideration of the buildings. Mr. Peach says: "From the moment that the plant arrangement which the engineer requires has been given to the architect, the former never expects, nor wishes to have anything more to do with the buildings until the architect is in a position to hand them over ready for the engineer's work to commence and plant to be erected." True; but during this time the engineer and architect must be in touch. The latter has to deal with legal questions affecting the building; their costs, as well as their construction. He must have a knowledge of the industry and what its developments are likely to be, he must have a general knowledge about machinery and electrical plant. The same advice will apply to all other structures in which the two professions are concerned. They must coöperate, while preserving their organized functions independently.

#### ARTIFICIAL STONE.

**A**MONG the many uses to which that marvellous product Portland cement has been applied, there is none that has secured more attention and caused more disappointment than its application to the manufacture of artificial stone, and in no other department of its use has conservatism and prejudice so effectively curtailed its employment. Portland cement as a binding material for rough concrete for foundations, dams, and for all purposes in which the ordinary laborer may apply it has secured for itself a position above all rivalry, and in calling to mind the importance of such works in Portland-cement concrete as are to be found on the Nile, at Dover, and the Midlands, British engineers can congratulate themselves in being at the forefront in the adoption of a material which will make their work live, humanly speaking, for all time.

Our architects, however, have not been so ready to admit its usefulness as a substitute for natural stone. The reason is not far to seek. Skilled workmen having a life-long acquaintance with Portland cement and its humors are few and far between. Evidences of gross ignorance in the treatment and application of cement are many, and though the poor results often obtained are patent to the most unobservant eye, it is not always that the cause of the failure is traced to its proper source.

Almost every builder has at one time or another essayed to make his own artificial stone, and the great majority of them have given up the attempt in despair. How often have we seen crude attempts at the making of a cottage threshold or window-sill composed of an unsuitable aggregate, badly applied? It is a common enough sight to see in buildings of doubtful architecture and still more doubtful permanence, a concrete step with large pieces of the surface and corners broken away and portions of red brick and pebbles protruding. Such use of concrete has tended to discredit the works of important artificial-stone manufacturers in this country, who are now executing architects' designs in a material which has in its appearance all the good qualities of the best building stones and in its durability far surpasses anything that nature has placed at the disposal of the builder.

In adapting cement to the intricate and delicate work of forming architectural detail and ornament, there is a great field of the most fascinating work open to the architect who will intelligently apply this material to the reproduction of elaborate architectural forms; but unless they approach the subject from a sympathetic standpoint and realize from the first the nature of the medium which is being used, disappointment is more than likely to ensue. One sometimes sees an attempt to execute an undercut design with sharp detail in Portland cement, whereas an elementary knowledge of the material would show that in order to execute such work a thin "slip" must be run into a gelatine mould with very disappointing results, due to air-holes and cracks from unequal expansion of the "slip" and the coarser aggregate forming the body of the casting. To secure fine detail the aggregate should be "dry pressed" and rammed into a hard mould, but, of course, such a process cannot be applied to an undercut design.

The average plasterer who has spent most of his time working in plaster of Paris will persistently declare his thorough acquaintance with Portland cement and will then proceed to run his cornices in neat cement. One cannot be disappointed if such work should have the unsatisfactory appearance and texture of neat cement, nor will work executed in this manner match other castings made with a proper aggregate and cast in a hard mould.

The manufacture of artificial stone should invariably be entrusted to firms making a specialty of this product. The most careful supervision of every detail by experienced men is necessary, and the workmen properly trained in making ornamental concrete work are rarely to be found except in the employment of such firms.

In color, perhaps, the most satisfactory results are obtained in the natural gray tint of the cement. Artificial stone of this color is indistinguishable from the best Portland stone when the former has been weathered for a few months. The principal tints now used are those to obtain the effect of yellow and red Mansfield stones. These tints are obtained by the addition of small quantities of iron oxides while a brown tint obtained by the addition of roasted iron oxide is also produced to some considerable extent.

The present practice in artificial-stone making is to well mix the coloring matter, cement, and aggregate in a dry state. Water is then added and the material well rammed into hard wood or iron moulds. This ramming is of great importance, as its object is to expel all the air from the moulds, and if it is not properly done the concrete, when set, will have a pitted surface which will entail a considerable amount of trouble afterwards in rectifying. The concrete is left in the moulds for two or three days until it has become sufficiently set to enable it to be safely removed.

It is not often that the stone, after removal from the moulds, has a perfectly true surface; minute air-holes and other imperfections are almost invariably present. The material must be "dressed" to give the surface the desired effect. It is in the dressing that bad results from unsatisfactory workmanship are most frequently obtained. After filling the holes with a thin mixture of cement worked into the concrete by means of a rubbing stone, the whole of the surplus grouting should be carefully removed by means of a steel tool. It sometimes happens that a workman in attempting to put a good surface on to a bad casting will apply a thin layer of neat cement over the whole and allow it to set, such stone may look well when it is in the workshop,

but after erection the effects of heat and weather quickly show themselves in the shape of numerous cracks, after the manner of a mosaic pattern, covering the stone. This effect is due to the difference in the co-efficients of expansion between the general body of the concrete and the thin covering of neat cement. The fault is all too frequent in work done by inexperienced and careless workmen.

Dressing is sometimes completed after the stone has been erected in the building. In the finishing of large buildings in concrete this rough surface has been obtained very satisfactorily with the aid of pneumatic tools.

An unsightly effect often noticed in artificial stone work is the white efflorescence from the Portland cement. Analysis of this white matter proves it to be sodium carbonate, which in the drying of the stone comes out to the surface and is left in a crystalline form by evaporation. The difficulty is not a serious one and disappears when the stone has properly dried out. The deposit may then be brushed or washed off.

Ornamental work in artificial stone is not always cast, as the material, when formed of a suitable aggregate, can be carved in much the same manner as natural stone. The usual process, however, is to prepare a model of the ornamental work in clay, plaster, wood or other convenient medium, and from this model to take a plaster cast in as many sections as may be necessary. When the plaster is thoroughly set it is removed from the model and the inside painted over with shellac or other non-porous compound to prevent any moisture from the artificial stone casting penetrating the plaster. Before the concrete is placed in the mould the latter is painted over with oil or with a mixture of clay and water to prevent the concrete sticking and pulling away in patches when the mould is removed. This precaution is also necessary in the case of wood and iron moulds. It must be repeated each time a casting is taken from a mould in order to ensure clean work and sharp arrises.

An artificial stone which lends itself peculiarly to the ordinary work with the mason's chisel is the silicate-of-limestone which has recently been re-invented and patented by Mr. Ford of Wrexham. This material is not, however, a product of Portland cement, but is composed of a mixture of silicious sand and lime treated with water and subjected to high pressure until it is set. This stone is said to be indistinguishable in texture and appearance from natural stone.—*Stone Trades Journal*.

## ILLUSTRATIONS

[Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.]

HOUSE OF J. C. HOOE, ESQ., WASHINGTON, D. C. B. MESSRS. TOTTEN & ROGERS, ARCHITECTS, WASHINGTON, D. C.

ELEVATION OF THE SAME.

INTERIORS IN THE SAME.

THE ROYAL MARITIME EXCHANGE, BERLIN, PRUSSIA. HERR P. KIESCHKE, ARCHITECT.

THIS and the following plates are copied from *Zeitschrift für Bauwesen*.

DETAIL OF THE SAME.

PLANS AND ELEVATION OF THE SAME.

### Additional Illustrations in the International Edition.

THE CARRIE TOWER: BROWN UNIVERSITY, PROVIDENCE, R. I. MR. GUY LOWELL, ARCHITECT, BOSTON, MASS.

THIS memorial tower was presented to the University by Count Bajnotti in memory of his wife.

DETAIL OF THE SAME.

ENTRANCE DOORWAYS: PALACE OF LIBERAL ARTS, LOUISIANA PURCHASE EXPOSITION, ST. LOUIS, MO. MESSRS. BARNETT, HAYNES & BARNETT, ARCHITECTS, ST. LOUIS, MO.

FORMER CHURCH OF S. MIGUEL DE LOS REYES, AND AN UNIDENTIFIED CHURCH, VALENCIA, SPAIN.

## COMMUNICATIONS

[The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.]

### THE DEAD CHURCHES OF LONDON.

TO THE EDITORS OF THE AMERICAN ARCHITECT:

Dear Sirs,—A paragraph from the *Boston Herald* in the *American Architect* for July 16th prompts me to write upon the subject of "Dead" churches in London. The correspondent of the *Boston Herald* is no doubt right as regards Sunday attendance at many of the City churches. But a large number of the old buildings are open at midday on weekdays, either for religious services, preaching or organ recitals, and are well attended; and during Lent are *crammed* with men—City men, during their dinner hour. Others are opened very early on weekdays, to accommodate women and girls who have to leave the suburbs by early trains and arrive too soon for their work. These girls are welcomed and have books provided; or they have a service of song, and I think in some cases are given coffee in the vestries. It seems a pity that grand old churches, mostly by Wren, should be destroyed. The expense of moving them is too great, and if they can be made useful, why pull them down? I have often wondered the American millionaires have never thought of purchasing for re-erection those which must absolutely be pulled down. Respectfully,

S. BEALE.

## NOTES AND CHIPPINGS

**GALVESTON'S NEW SEA-WALL.**—The sea-wall of Galveston was completed recently. It has cost \$1,198,318. It is 17,593 feet long, 16 feet high, 16 feet at base and 5 feet wide on top.—*Exchange*.

**LIVERPOOL CATHEDRAL.**—When the present King Edward—he was, of course, Prince of Wales then—laid the foundation stone of Truro Cathedral in 1880, Archbishop Benson declared that it was the first instance of the kind that had occurred in England since the Norman conquest. It was at about that time that the movement for a great cathedral in Liverpool began to take form, and now the King has just laid the foundation stone of a building which is likely to become the most noteworthy architectural feature of that city. The architect is George Gilbert Scott, grandson of the famous Sir George Gilbert Scott, and his design was chosen from the plans of more than one hundred competitors. The area of the new cathedral will exceed that of any other in England. The church, with its chapter-house and morning-chapel, will cover about 90,000 square feet. Its full length will be 584 feet. Whereas the nave of Westminster Abbey is 102 feet high, the Liverpool nave up to the barrel vaulting will be 116 feet. The part now to be put in hand—the choir and central space—will accommodate 3,500 people, while the finished building will accommodate 8,000. As to finance, the cost of the first part might seem to be secured, for the committee has £230,000 of the necessary £240,000; but preliminary charges have absorbed £32,000. There is not much anxiety, however, on the score of future contributions. The committee already has received various specific gifts, notably a magnificent chapter-house to be erected by the Freemasons of West Lancashire to the memory of the late Lord Lathom.—*N. Y. Evening Post*.

**VERSAILLES LAKES DRYING UP.**—One of the most striking consequences of the continued extreme heat is the fate which has befallen Versailles, that splendid and royal city having become almost uninhabitable owing to the partial drying up of the great Suisses Lake. All the fish in these waters, mostly carp, and many of them of enormous size and more than two centuries old, died one night from asphyxiation, and as soon as the inhabitants saw them floating on the surface of the lake they filled up no less than fifty carts and transported 28,000 kilos of dead fish to Paris, where they were sold for a sou a pound. The Prefect of Versailles sent an entire regiment of engineers to stop this traffic, and the men are now drawn up around the park. The fish in the other lakes, however, are dying at a great rate, and the stench permeates all Versailles, driving hundreds of residents away.—*N. Y. Times*, Aug. 5.

**THE DECORATION OF THE HOUSES OF PARLIAMENT.**—The painful subject of the decoration of the national palace of Legislature was brought up in the House of Lords on Monday by Lord Stanmore,

who moved that a Select Committee be appointed "to inquire and report with respect to the unfinished condition of the rooms in the Palace of Westminster appropriated to the service of this House, and their approaches." Unfortunately, to the majority of English members of Parliament, the idea that rooms in a public building are "unfinished" because they have not received the artistic decorations once vainly intended, would not recommend itself as "practical." The temper of the House of Lords is more sympathetic in regard to art, but unhappily they have no control of the purse-strings. Lord Stanmore drew a satirical picture of what the foreign visitor would see on entering the House through Westminster Hall: the empty niches, reserved forty years ago for the statues of Marlborough and Wellington, still vacant; the panels surrounded with stone mouldings intended as a framework for mosaic, but only inclosing spaces of blank paper; and so on. Lord Windsor, of course, could only express sympathy coupled with the conviction that it would be hopeless to approach the Treasury on the subject at present; it is always impossible "at present" to spend any money on art; but, the future opportunity never arrives. In some other countries it would be considered a national discredit that the most important building in the country, after being up for more than half a century, was still wanting its highest class of artistic embellishment. In this country it is regarded as a trivial matter, and Lord Stanmore's motion was "negatived without a division."—*The Builder*.

"WHAT THE PEOPLE SLEEP ON."—At a recent Sanitary Congress in Glasgow, Peter Fyfe read a paper entitled "What the People Sleep On." With the view of tracing the disease with which the sanitary officer has to deal, he had, he said, instituted an investigation into the bed-making trade. Calling to his aid some makers of common wool flock, vendors of this material, and members of the sanitary staff, he proceeded to examine the nature of wool flock, and found that it was manufactured from a mass of rags, the rejected of every class of the population, from the wealthy of the West End to the tramps and vagrants of the East End. To explain what he observed on some of the torn garments would be impossible. Nothing in the nature of cleansing or disinfecting was attempted. All went into the machine if sufficiently dry. At the other end it came out flock. From one of the factories visited he secured a pound of flock as it came from the machine. At the sanitary office he weighed off half a pound, and the corporation chemist gave him two jars of distilled water, in which he twice rinsed this quantity, and subsequently he had the water analyzed, and it compared very badly with the analysis of a similar quantity of average Glasgow sewage. In support of this statement he quoted a report by Dr. Buchanan, the city bacteriologist, who said it would be safer to sleep on a bed filled with sewage than on this material, upon which 78 per cent of their humbler fellow-citizens were nightly reposing.

VENTILATING AND WARMING A BERLIN CHURCH.—An interesting system of combined warming and ventilation was introduced by Prof. H. Fischer, a well-known heating engineer, in a Berlin memorial church that in general plan resembles St. Paul's Cathedral in London, though of smaller dimensions, the height of the nave and transepts being 82 feet and of the dome 237 feet. The corresponding measurements in St. Paul's are 100 feet and 360 feet, respectively. To the height of 80 feet from the floor the walls are traversed by hot-air chambers, so that from the ground to the galleries, 22 feet above, there is no perceptible difference of temperature, the air being kept constantly at 60 degrees. The radiating surface is placed high up, in the neighborhood of cooling surfaces, maintaining a higher temperature in the upper portion of the building and intercepting and reheating the cooled air in its descent toward the lower part occupied by the congregation. There are thus four strata of air of different temperatures. On the ground floor and in the galleries there are very few coils, but along the first entablature, at a height of 95 feet, the coils are sufficiently numerous to counteract the loss of heat through the walls, which there are no longer traversed by hot-air channels, and to maintain from this level to that of the second entablature—at a height of 145 feet, or 50 feet above the first—a temperature a few degrees higher than that in the parts below. Other coils are fixed above the second entablature and in the lantern of the dome. To avoid the dangerously chilling draughts that would follow the opening of the doors in the intense cold of a Prussian winter, the entrances are provided with double swing doors and coils are placed in the intervening passage. Professor Fischer maintains that the system of heating the upper more than the lower regions of the air is the only proper course in such lofty buildings as churches. He holds that whereas, with the ordinary method, the air heated on or below the ground level is cooled on reaching the roof, and, fouled by the products of respiration, descends on the heads of the congregation, unless withdrawn by some such exhausting arrangement as is carried out in the English houses of Parliament, in his system the fresh air is warmed to an agreeable temperature in its passage through the channels in the walls, and its ascent is favored by the coils between the first and second entablatures. The coils in the dome, although

they do not contribute to the warming of the parts occupied by the worshippers, serve effectually to prevent the descent of the foul air by securing its continued ascent toward and escape through the apertures in the lantern that crowns the edifice.—*C. W. in the Metal Worker*.

SCYTHES AS CHURCH ORNAMENTS.—At first sight the scythe is a strange ornament for a church, but there is nothing incongruous in these curious agricultural implements as seen in the parish church of St. Mary's, at Horncastle, in Lincolnshire. Thirteen of these blades are nailed above the door in the north chapel. At one time the blades numbered forty or fifty, but owing to rust and decay many of them have been lost. Each of the scythes is about a yard in length. The general belief is that these blades were placed in the church in commemoration of the zeal of peasants who wielded them in defense of their faith in the rebellion known as "The Pilgrimage of Grace," which had its rise at Louth in 1536. When the people saw the ruins of their churches and abbeys they rose in revolt, and, arming themselves with the instruments of husbandry, such as the scythes, they went forth to encounter the enemy. They were beaten and dispersed, but in the eyes of their countrymen they were heroes, and the rude implements with which they fought were deemed worthy of an abiding place in the old church, where the peasants had worshipped.—*Christian Age*.

MILAN CASTLE.—Every American tourist who has ever visited Milan will be glad to learn that active steps are now being taken for the repair and preservation of the famous old castle of Milan, overlooking the Piazza d'Armi, and which a short time ago was, on account of its tottering condition, on the point of being consigned to demolition. It was built by the Sforza Dukes of Milan, who reigned there in the fifteenth century, on the ruins of the still older castle of the Viscontis, which had been almost entirely razed by the populace in 1448. It was regarded in the Middle Ages as the proudest and strongest fortress in Italy, and served as a model, in part, at any rate, for the Kremlin at Moscow. Its history is full of interest. It has had many different masters of divers nationalities since the days of the Sforzas, and has sustained many sieges, the last of these being at the close of the eighteenth century. Possibly because its fortunes have always been identified with tyranny, and because it has ever been, in the eyes of the people, the outward and visible sign of foreign domination, it has been so neglected by the Italians of the present day, and it is doubtful whether any of the Milanese now living, save the soldiers quartered within the precincts of the castle, have ever crossed its threshold. However, now the municipality of Milan and the government have awakened to the importance of preserving this interesting monument, and work has been begun in clearing out the wide and deep moat, removing huts and shanties which have been built against its walls, restoring the drawbridges and the battlements, and, in one word, taking the necessary steps for its preservation.—*Marquise de Fontenoy in N. Y. Tribune*.

AN IRISH CITY VENICE.—Cork is the Venice of Ireland. It is built on a group of islands, and nine bridges connect these islets with the mainland. The River Lee is navigable, and Cork harbor could contain the whole of the British navy. An ancient custom, that sounds quite Venetian, still prevails in this Irish city: every three years the Lord Mayor proceeds in his state barge to the mouth of Cork harbor, and throws into the sea a dart that has a gilded head and a shaft of mahogany. This ceremony implies the dominion of his town over the adjacent sea, with all its inlets and islands.—*Boston Herald*.

REARRANGING THE CHAMP DE MARS, PARIS.—The following is the scheme definitely adopted by the Municipal Council for rearrangement of the Champ de Mars. At each side, along the Avenue Suffren and the Avenue La Bourdonnais, a space 40 metres wide will be reserved for a first line of buildings, with shops on each face. Then will come an inner boulevard 25 metres wide. A second line of buildings 20 metres wide will follow, but restricted to a height of 15 metres, and without shops on the side next the Park of the Champ de Mars. The esplanade of the Champ de Mars will be cut from east to west by two broad roads on the axes of the Rue de Grenelle and the Rue St. Dominique respectively, and all the portion between the first of these roads and the river will be laid out in "jardins Anglais," while the opposite space, down to the Ecole Militaire, will be laid out in "jardins à la Française," with large spaces reserved as playgrounds. A free space 60 metres wide will be reserved in front of the Ecole Militaire, so that Gabriel's fine façade will, as before, close the perspective at the end of the Champ de Mars. This scheme of course necessarily implies the demolition of the Galerie des Machines, which, however, may very probably be rebuilt on some other site, where it will be useful without interfering with architectural effect.—*The Builder*.





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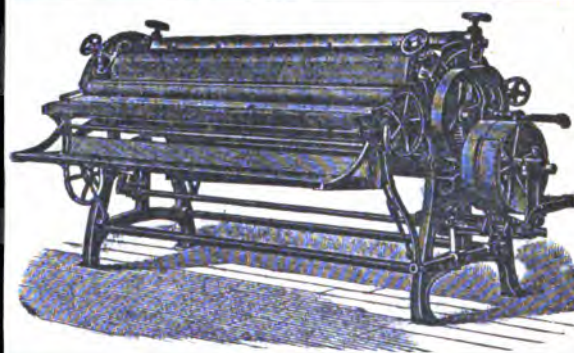
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VOL. LXXXV

\* REGULAR EDITION \*

NO. 1496



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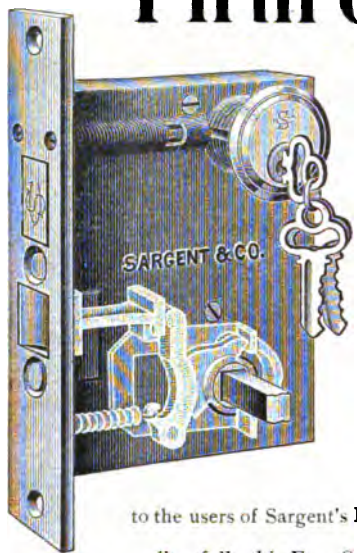
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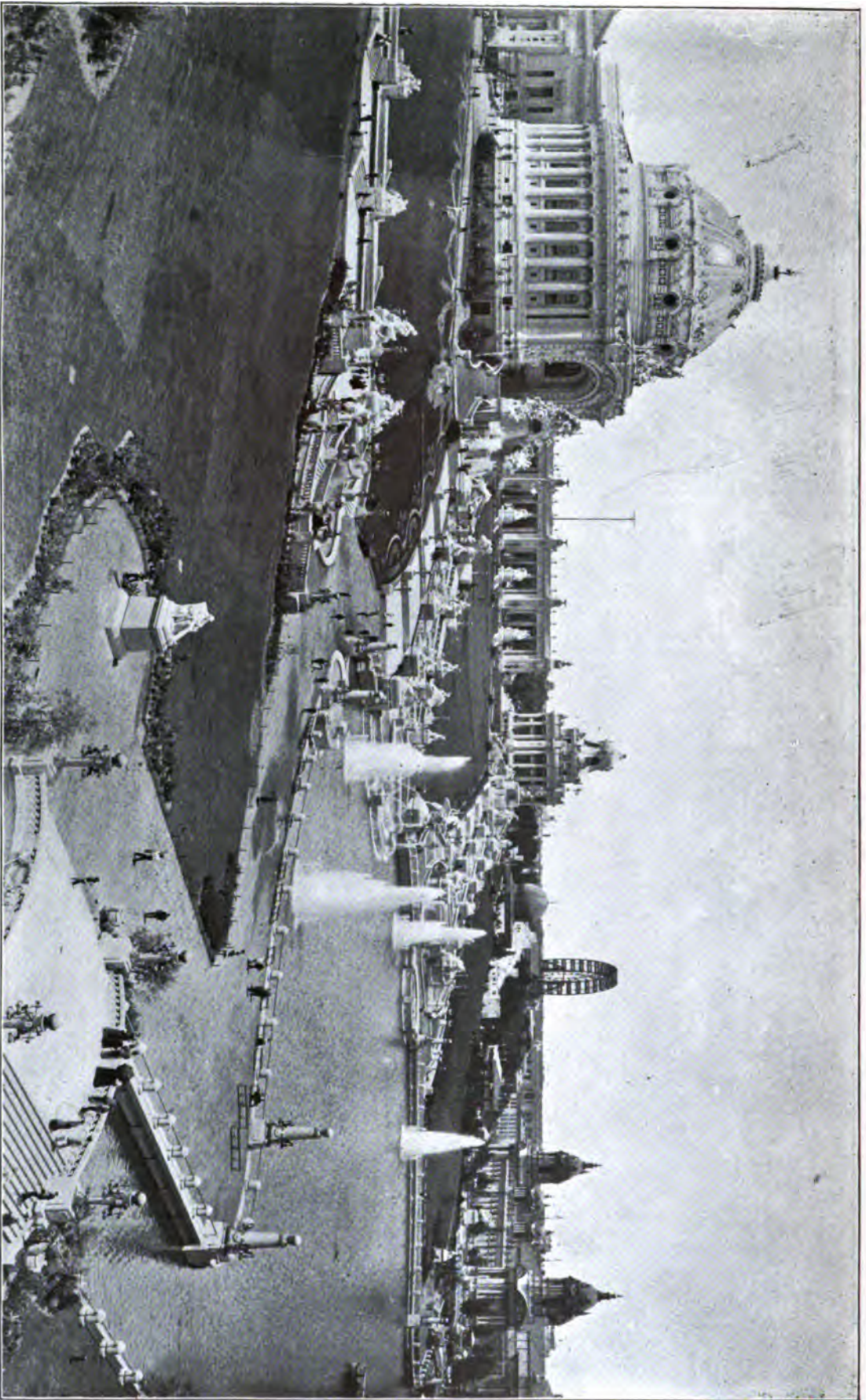
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*Festival hall and the Cascades: Louisiana Purchase Exposition, St. Louis, Mo.  
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*The American Architect,  
August 27, 1904  
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*The Brazilian Building.*

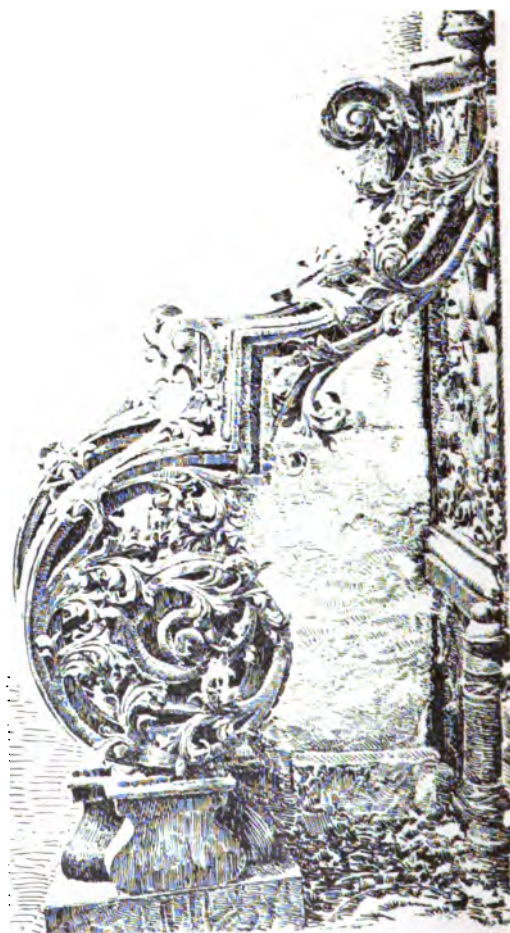
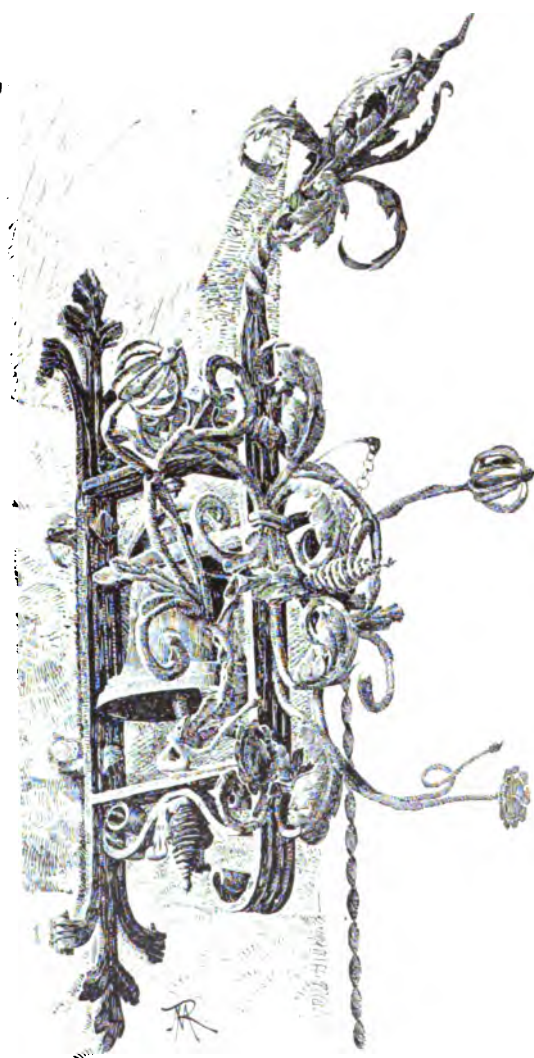
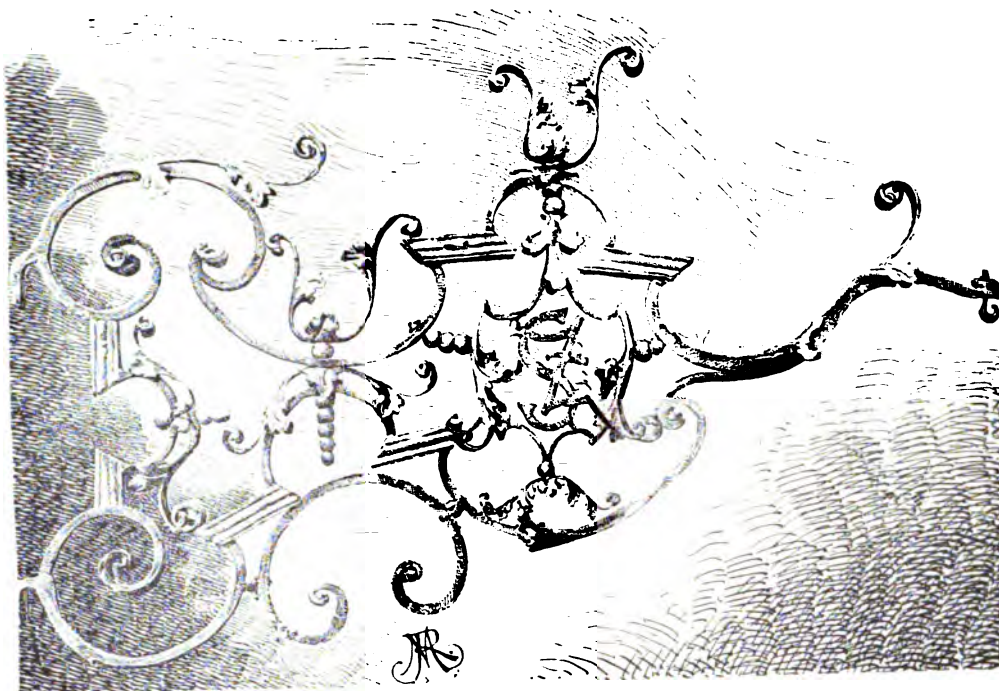


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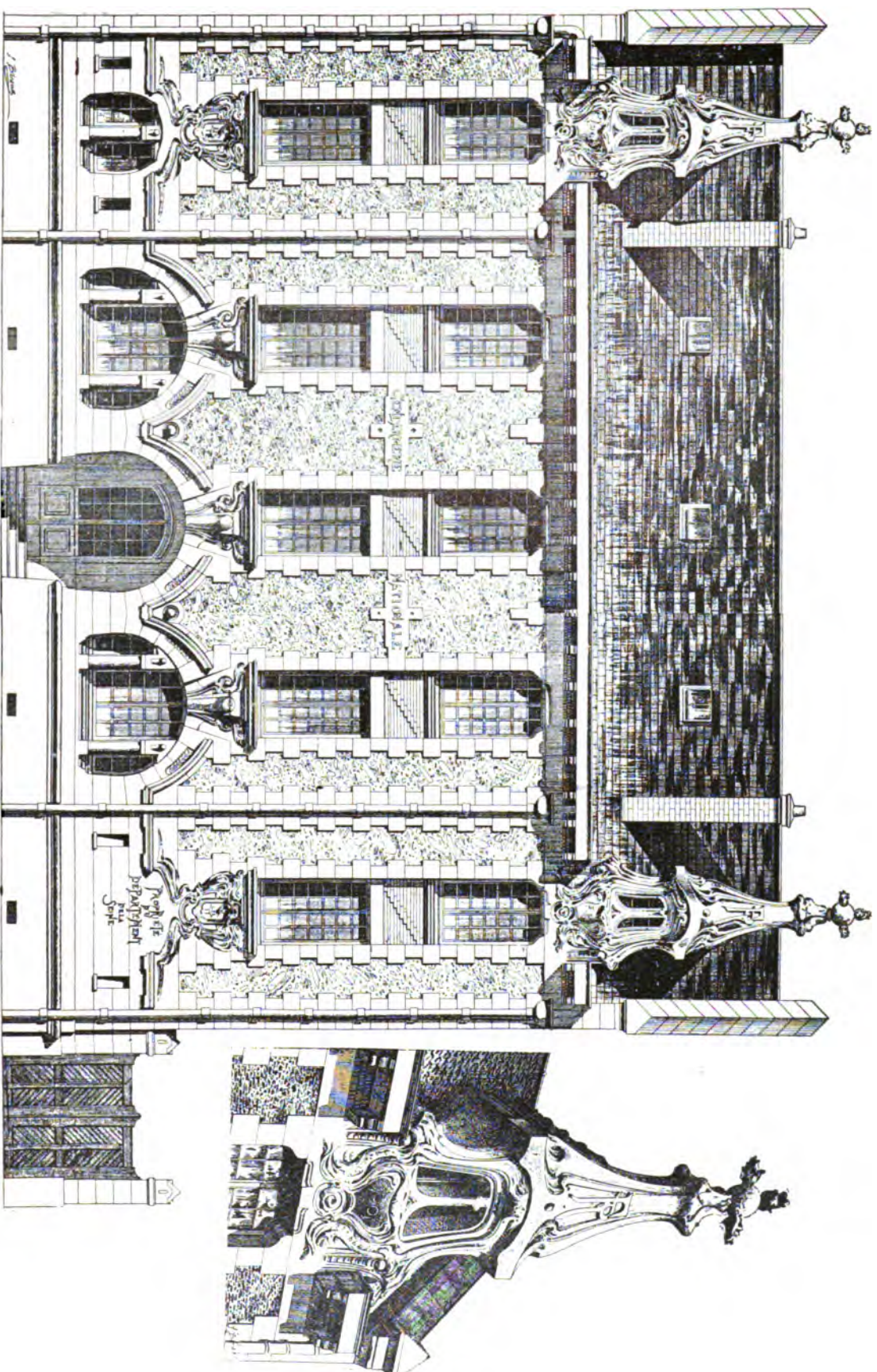




*Samples of Austrian Wrought-iron Work.*

*From Zeitschrift für Bauwesen.*





*Gendarmerie Barrack, Arcueil, Seine, France.  
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VOL. LXXXV

SATURDAY, AUGUST 27, 1904

No. 1496



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Additional: The Penn Mutual Building, Milk St., Boston, Mass.— Entrance to the Same.— No. 35 Emser Allee, Dresden-Blasewitz, Prussia.— Sketch Designs for United States Government Buildings . . . . .

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**A** LAW which was added to the Massachusetts statutes by the last Legislature may have an interest to architects—of a kind—although the wrong-doers it was aimed at belong to another walk of society, for most people would hardly think of classing an architect with the coachman, cook or steward who demand a "rake-off" for themselves from the dealers whom their employer favors with his custom. The common law, we believe, holds equally guilty the giver and the taker of a bribe, but the new statute we refer to makes specifically subject to fine or imprisonment anyone who offers or promises "any employé any gift with intent to influence his action in relation to his principal's or employer's or master's business, or an agent, employé or servant who corruptly requests or accepts a gift or guaranty, or a promise to make a gift or to do an act beneficial to himself under an agreement or with an understanding that he shall act in any particular manner in relation to his principal's, employer's or master's business." As will be seen, the language of the act very precisely covers the accepting or exacting of "illicit commissions," as they are called, whether direct or indirect, by any architect in his dealings with material-men or contractors. It is one of the commonplaces of practice for an architect to find himself offered by material-men or contractors a commission which is neither more nor less than a bribe, and so a thing no honorable practitioner can accept, and it is equally a commonplace to hear the offerer of the bribe, when he finds his offer declined with more or less emphasis, declare that there is no use in being "touchy" about it, as there are "lots of architects" who not only accept but demand these commissions, "in fact, you'd be surprised if I should tell you the names of the high-toned architects who stand me up regularly for a good big rake-off." Where there is smoke there is apt to be fire, and it is a great pity that an

authoritative "Who's who?" in this matter of illicit commissions cannot be compiled, for the sake both of the public and the more honorable members of the profession. Recent issues of the English architectural journals contain complaints that the giving and accepting of illicit commissions in that country is increasing rather than diminishing, and if the demoralization should be spreading in this country, too, those who are willing to accept its dishonest advantages will do well to keep out of the reach of Massachusetts law.

**T**HE New York Superintendent of Buildings is said to be very much exercised over the number of elevator accidents, and disposed to think a remedy is to be found in compelling all elevator "boys" or runners to pass an examination. Mr. Hopper is quite right in esteeming the elevators deserving of his attention, though his argument that because locomotive-engineers have to pass an examination so elevator-runners should be compelled to do the same thing is rather fallacious. Although the vertical traffic lines of the country carry annually more passengers than do the horizontal lines the traffic is carried on under very different conditions. In the latter case practically the whole movement and every part of the machine that creates that movement is under the direct personal control of the engineer and the necessity of caring for it and the ever-changing conditions of the road-bed, grade, traffic, signals, and so on, keep him awake and alert, and consequently the calling has attraction for a high grade of man. But next to passing one's days in a prison-cell the most limited career, surely, is that of an elevator-runner, travelling up and down in an enclosed and generally dismal shaft, eight or ten hours a day. It is only real necessity that can induce an active-minded and intelligent man to take such a position, except in large office buildings, where there is enough of human friction to keep mental rust from accumulating. The elevator accidents that could be avoided by making runners pass an examination are comparatively few. There is no other class of men that we can think of who are forced to take the responsibility of so many human lives upon them while they themselves are in so complete a state of helplessness, and training and examinations can have but little ameliorating effect.

**T**HE points toward which Mr. Hopper should turn his attention, taking a lesson from the way in which the steam-boat inspectors did *not* inspect the "General Slocum," are to secure real inspections of the apparatus by the elevator-makers or by those insurance companies which make a business of insuring against elevator accidents, and then to make sure that the person who has the handling of the machinery in the building, be it engineer or simple janitor, is a competent mechanic. The real responsibility rests with the building owner, who, in place of making sure that his employés are competent, usually contents himself with simply paying the premium on an employer's liability policy. If it is the elevator-runner who is to

blame for accidents, we wonder that some wiseacre does not ask for a law compelling the elevator to always carry two runners, on the plea that one might drop dead and that there should always be another on hand to take his place, just as the second pilot on a New York ferry-boat is always on hand for an emergency.

**S**PEAKING of janitors, a class of worthy men whom the newspaper humorists try to make us believe are the most autocratic of human beings, we note that a new and unwelcome function has been thrust upon them in New York by the reviving of a health ordinance, which seeks to compel the separation of household garbage from household ashes and other refuse. The janitors of East Side tenements declare that their tenants are too ignorant and careless to see to the proper separation of their household wastes, the consequence being that the unfortunate janitors, if they would avoid the fine which the ordinance imposes upon them for the non-fulfilment of a function that surely does not belong to them to discharge, have to spend much of their time in the unpleasant and insanitary task of separating the garbage from the other wastes, to the neglect of their other duties. Here, again, relief is to be had not through seeking the repeal of the ordinance, for it is a good one, or by organizing a strike, as is threatened, but by making the owners or owners' agents understand that they can and should by a manipulation of rents make their tenants understand that their refuse must be sorted as the law directs.

**S**IGNOR ERNESTO BIONDI has actually begun suit to recover damages from the Trustees of the Metropolitan Museum of Art in the sum of two hundred thousand dollars because of their failure to exhibit his group, the "Saturnalia," in the manner and for the time stipulated in the contract between them. As the plea is made, the breach of contract seems indisputable, and it will be surprising if the talented sculptor does not receive a verdict in his favor; but we do not believe that the petit jurors of New York have yet reached such a stage of æsthetic enlightenment as will induce them to award for mental anguish, damaged feelings and reputation very much more than two hundred thousand cents. On the contrary, the jury is much more likely to wonder why the trustees do not put in a counter-claim in equal amount for the free advertising that their action has given to the unquestionably accomplished artist.

**T**HE sculptor is in a rather difficult position and might stand to lose more than he is likely to gain, even if his real object is to secure "vindication" for his reputation and not ducats for his purse. At the moment, the "Saturnalia" is in the country under bonds, it having been allowed to come in free of duty for exhibition purposes at the Buffalo fair. Now if Signor Biondi should be awarded in his suit against the trustees nominal damages only, it would be possible for that body to cause his group to be set outside the Museum doors, where it could be attached by the customs seizure officers, and the heavy duty on a modern work of art might then be exacted by the Government from the owner, who is not likely to be any

other than the sculptor himself, since the group is no mantel ornament and a purchaser is not likely to be found for it at once. Fortunately there are enough gentlemen amongst the trustees to see that the original discourtesy of their executive officials is now palliated, in any event, by delivering the group still protected by the official bond "f. o. b." some Mediterranean steamer.

**T**HERE are different ways of looking at things, and when we noted some of the newspapers speaking last week of the sale of one hundred and twenty-three thousand acres of timber-land in Vermont as a transaction merely notable because of its size, we considered it rather as a happening that should cause mourning, because the timber growing on the land is to be converted into paper-pulp and the land itself left bare, valueless and unproductive for a generation. Worse than this, the land so denuded may, and probably will, become a public nuisance, a generating cause of waste of public funds. Nothing is more certain than that treeless mountain-sides are conducive to dangerous spring freshets, and towns and villages situated along streams fed from the water-shed about to be denuded would do well to examine the situation, and if they find they have no redress against the pulp-mill men, as they probably have none, then to look to their dams and bridges, so that next spring's thaw may not find them unprepared. In Massachusetts and in some other States the law declares that any man who allows his wood or brush fire to run onto his neighbor's land must pay damages to such neighbor. What is good law for one element may be good law for another, and the pulp men would find it very uncomfortable to have the timber States pass laws to the effect that the owner who allows water falling on, or generated on, his land to flow onto the land of a neighbor to his injury must pay damages. Somewhat analogous legislation controls the cutting of timber in Switzerland, we believe, and we may in time—too late, probably,—reach the Swiss standard of civilization.

**P**HILIP WEINSEIMER may live to be thankful that his name does not slip as glibly off the tongue as did that of the late Sam Parks, and though he may find the law meting out to him for the same offence the punishment that befell the latter, he may at the end of his term of imprisonment, if he be actually convicted, be able to return to the walks of life a comparatively unmarked man. Weinseimer, a plumber, and just now the president of the Building Trades Alliance, has been indicted by the New York Grand Jury for extorting the sum of twenty-seven hundred dollars from George J. Essig, a contractor for plumbing work, who pretended to be willing to be mulcted in that amount rather than have "struck" the job he had a contract on. These random and sporadic attacks upon the widespread system of graft as practised by building trade leaders upon owners and contractors cannot do much good. What is needed is a sustained effort all along the line, a constant hauling in of the drag-net that will bring to the surface the big and little "grafters," so that they may be not only exposed to sight but punished. The men who are engaged in providing for their families' rise in the social scale by the pleasant and easy application of the methods of the extortioner care precious little for vicarious punishment.

APPRENTICESHIPS.<sup>1</sup>

THE Government Labor Statistics show that in the cities of New York, Chicago and Pittsburgh, respectively, among those who are engaged in skilled labor, 60, 70 and 75 per cent are men of foreign birth. This is a fitting sequel and the logical result of the proscription of apprenticeships in this country by organized labor. Where is the American, native-born or naturalized, worthy of the name, but must admit that this is a crime? It does not seem that the people of this country have as yet come to a realizing sense of what this means, or they would surely rise up as one man and demand a remedy. Do you realize that a father cannot teach his own son the trade in which he is engaged? No, I am sure you do not. It is hard even now for us who have seen the results of a generation to realize the true situation. And this tyrannical proscription reacts upon the members of the trades unions themselves, for it imposes the same hardships upon their own sons as it does upon the sons of their employers. When we carefully consider this deplorable condition of affairs, we cannot escape the conclusion that the honest and industrious men who compose perhaps the greater part of the large army of skilled workmen in America have suffered their manhood and their independence to be stultified and have subordinated their highest good to the selfishness and caprice of unscrupulous and designing leaders. There is not even the shadow of a doubt that the interests of the American mechanic, as well as those of his employer and those of the American people at large, lie in maintaining a broad-minded and liberal system of apprenticeships.

Recently, in writing on this subject I used some strong language, and I want to repeat it here. It was to the effect that it is more heinous to prevent a young man from learning a trade than it is to kill a non-union man. When organized labor kills a non-union man, that is the end of him. But with the American boy, who is deprived of the opportunity to learn a trade and who is too proud to work as a common laborer, it is different. Finding the professions and various departments of business overcrowded, or lacking the resources or the encouragement to prepare himself to carry them on successfully, he drifts into idleness and becomes a tramp on the face of the earth, and finally, as is often the case, ends his life as a criminal. Hence I repeat that in my opinion the killing of a non-union man is less a crime than the barring out of an American boy from learning the trade of his choice. The right of every young man to learn a trade should be as free as the air, and it is a reproach to the fair name of our free and enlightened nation to stand idly by and allow any body of men to dictate what our boys shall or shall not do.

I have read a great many specious articles in labor papers which seek to defend the proscription of apprentices on the part of labor unions, and it is upon such stuff in the main that organized labor is fed. As a result of all this we are brought face to face with a grave and dangerous crisis in the industrial history of our country. It therefore becomes our solemn duty to devise a remedy for this evil which will strike at its root and afford permanent relief from the unlawful and unpatriotic domination of labor unions. Despairing of an awakening on the part of the members of the labor unions themselves, to a realization of their own best interests, and to a sense of common right and justice, I am convinced that the only effective cure for this malignant evil lies in the establishment of "Trade Schools" throughout the country. I do not refer in this connection to polytechnic schools or schools of technology, or even to the manual-training features of our common schools. All of these have their well-recognized place in the educational system of the country, but they are not to the purpose. I refer now to the "trade school," pure and simple. But it is far easier to see and understand wherein lies the remedy than it is to put that remedy into practical operation, for here again we are confronted by the determined opposition of organized labor. I can still vividly recall the opposition which Colonel R. T. Auchmuty met from that source, at the time when the New York Trade School was established. This opposition continued for a number of years afterwards, and I have no doubt that it is more or less in evidence up to the present time. In 1891 an effort was made to establish a trade school in the city of St. Louis, to which Col. Auchmuty promised to subscribe \$1,500 a year for three years (having previously subscribed \$3,000 a year for three years to the Philadelphia Trade School. We met with the same determined opposition in St. Louis, and there is no doubt that it had much to do with our failure to establish a trade school at that time. I wish to say that the New York Trade

School established by Col. Auchmuty is in a prosperous condition. During the past year it had 777 scholars, the largest number in its history. I desire also in this connection to pay a tribute to the memory of Col. R. T. Auchmuty, who established the New York Trade School single-handed and alone, in the face of such powerful opposition. In my humble opinion he was a true-hearted and noble philanthropist of the highest type. There may have been men who have given more in other directions, but never any who have given more freely or in a better cause. In conversation with this good and noble man at his school in 1891, I learned that Mr. J. P. Morgan had made a contribution to the school of half a million dollars. I was curious to learn if it was a voluntary contribution on the part of Mr. Morgan or whether the contribution had been solicited, and was more than pleased to learn that the contribution was entirely free and unsolicited. This is merely an evidence that Mr. Morgan has a high appreciation of the importance and value of trade schools. Mr. Morgan's generous contribution did much to encourage Col. Auchmuty and urge on the good work which he had undertaken in the conviction that the trade school was the only salvation for the American boy desiring to learn a trade.

The Carnegie School of Technology and similar institutions throughout the country are intended to embrace a much larger sphere of learning than the trade school proper, and to those who are enabled to follow out their courses of study they are an inestimable boon. But there are thousands of American boys who have neither the time nor the means, and perhaps many, too, who lack the inclination to pursue such courses of study and yet are desirous and capable of becoming skilled mechanics and through the medium of their skill and industry would grow up to be most valuable members of society. It is a sad commentary on our civilization that the majority of such youths are arbitrarily deprived of the chance to realize their ambition to learn a trade. To such as these the trade school will be a godsend. The young man who has been compelled to forego the privilege of completing a common-school education and finds himself under the necessity of speedily preparing himself to earn a livelihood, is still able and should be encouraged to study the common-school subjects at a night school and to acquire a knowledge of bookkeeping and other business branches at the same time that he is learning to be a skilled mechanic at the trade school. Thus equipped he will be better able to battle with the world and to forge his way to the front than were at first a large portion of the successful business men of the present day engaged in the building trades and manufacturing industries. Some of the most successful men I ever knew were entirely illiterate, never having received any education whatever. In this I have reference to those engaged in carrying on some branch of the building business. I have heard it said that Andrew Johnson learned to read and write after he was married, his wife being his tutor.

While I have always felt the need of more education, I have never considered my business life a failure. I have been successfully engaged in business since I was twenty-one years old, and I owe it all to my being able to get a good trade and gain a start in life at an early age. I believe that habits of thrift and industry should be inculcated early in life, and a youth cannot acquire them unless he be given an opportunity.

The Hampton Normal and Agricultural School was opened in April, 1868, under the auspices of the American Missionary Association. In 1870 it was chartered by a special act of the General Assembly of the State of Virginia, and thus became independent of any association or sect. It is a private corporation controlled by a board of seventeen trustees, representing different denominations. This school was started for the purpose of providing a practical education for the children of ex-slaves. In 1878 it opened its doors to Indian pupils, and has since that time devoted itself to the training of negro and Indian youths.

The aim and purpose of the Hampton Institute was expressed thirty-four years ago by its founder, General S. C. Armstrong, and has never been departed from. It is as follows: "To train . . . youths, who shall go out and teach and lead their people, first by example by getting land and homes; to give them not a dollar that they can earn for themselves; to teach respect for labor; to replace stupid drudgery with skilled hands; and to these ends to build up an industrial system, for the sake not only of self-support and intelligent labor, but also for the sake of character." There are both night and day trade schools for boys and girls connected with this school. The tuition is free and the attendance is large and the school is doing a grand and good work in behalf of these two races of people, who of all classes are most in need of help.

<sup>1</sup> An Address delivered by Hon. Anthony Ittner, St. Louis, before the National Manufacturers' Association.

In California, they have two State institutions of this same character, both located in San Francisco, "The California School of Mechanical Arts" and "The Wilmerding School of Industrial Arts." Both have regularly equipped trade-school branches. The former was endowed by James Lick, a citizen of California, who earned his living in early manhood as a mechanic. In September, 1875, he executed a deed of trust by which he conveyed to certain trustees large amounts of property for various purposes, \$540,000 of which was to found and endow this school. The execution of this particular portion of his trust was delayed by litigation, and it was not until January 5, 1895, that the buildings were completed and the school formally established.

The latter was endowed by J. Clute Wilmerding, a prosperous merchant of San Francisco, who died in February, 1894, and among other things in his will provided for the endowment of this institution in the following words: "I give, devise and bequeath to the regents of the University of California the sum of \$400,000, upon the following trusts and condition, to-wit:

"To establish and maintain a school to be called 'The Wilmerding School of Industrial Arts,' to teach boys trades, fitting them to make a living with their hands, with little study and plenty of work.

"Said regents are empowered to purchase lands and erect thereon suitable workshops and places of instruction, and to equip the same with such machinery, tools and implements as in their judgment may be necessary and proper; but I suggest to them that the expenditure for the purchase of said lands, and the construction and equipment of said workshops and places of instruction, be kept within such bounds as that a portion of said four hundred thousand dollars thereafter remaining shall be able to produce an income sufficient to forever maintain and support said school.

"Said regents are authorized to invest the portion of said funds which shall remain after purchase of said lands and the erection and equipment of said workshops and places of instruction, in bonds, mortgages or other interest-bearing securities, but no portion of said fund, or of the income which may be derived therefrom, shall be used or diverted to any purpose other than the support and maintenance of said school."

These two schools are established on sites adjacent to each other, and coöperate as far as possible. Both are now in charge of the same director or principal.

The trades taught at the Wilmerding School are carpentry, bricklaying, plumbing, architectural ironwork, clay-modelling and artificial stone-work, wood carving, cabinet-making, electric and architectural drawing. The Lick School is devoted mainly to the machinery trades, pattern-making, model-making, forge work, moulding, machine-shop practice, electrical construction, machinery and ship drawing. During the current school year of 1903-4 a three-story brick addition, 40x90 feet, was built for the institution, and all the work on it was done by the boys of the Wilmerding School. This is a complete refutation of the argument sometimes advanced by the opponents of the trade-school system that the training received in such schools is not practical. It is a living monument to the wisdom and value of the system.

I wish to call your attention especially to the following language in the conditions of the trust made by Mr. Wilmerding: "to teach boys trades, fitting them to make a living with their hands, with little study and plenty of work." This statement of purposes on the part of Mr. Wilmerding was certainly not intended to underrate the value of theoretical education, nor to discourage any from acquiring it who are so situated as to be able to do so. But inasmuch as the essential purpose of a trade school is to teach boys trades, it was not his purpose to allow the institution founded by himself to dissipate and scatter its energies in the teaching of branches which belong to institutions of another kind. He therefore took especial pains to bring out clearly the distinction between book-learning and actual manual-training, and left no doubt that it was his purpose to found an institution devoted solely to the latter kind of instruction.

This view expressed by Mr. Wilmerding harmonizes entirely with my ideas of conducting a trade school, and in inaugurating a system of trade schools throughout the country, I would advise a strict adherence to this policy at the outset, in order that the greatest possible number of worthy young men may be afforded the opportunity to learn trades. Later on when such schools have become universal and are able to accommodate all who desire instruction in the field of skilled labor, it might be well to unite a certain degree of theoretical instruction with the training

of the hand. But this is a matter of detail which coming generations must work out for themselves in the light of the wide experience which the general establishment of such schools will afford. But the crying need of the present day is for schools which will devote themselves to the training of skilled mechanics who can step out of the schoolrooms into positions or jobs in which they can at once earn a livelihood. In my opinion a trade-school education, without any theoretical education at all, is far superior to the training received by the apprentice, under the apprenticeship system at present in vogue.

I confidently look forward to the time when trade schools will have become so general that no American boy with the ambition and desire to learn a skilled trade will lack the opportunity to do so. Then instead of having the trades of this country monopolized by men of foreign birth, there would be equal opportunity for all.

I hope to live to see the day when this country shall be blessed with the most intelligent, sober and industrious lot of skilled mechanics the sun ever shone upon. Such is my highest ambition and desire, and the consciousness that I may have been even in the slightest degree instrumental in bringing about such a happy consummation would be my highest reward and would inspire me with the feeling that I had not lived in vain.

There is no greater obligation resting upon the American people to-day than that of providing trade schools in which our youth may learn skilled trades, and in behalf of the American youth I hope to see this association place upon its records an appeal to the American people, and especially to men of vast wealth, to come forward in the fullness of their hearts and with the most lavish magnanimity for the accomplishment of this great and good work.

This great industrial problem is now before us. The method of its solution has already been indicated by Col. Auchmuty and other great men, and for the completion of the task I hope and confidently believe that the wisdom and patriotism of the American people will prove entirely adequate.

#### GERMAN TECHNICAL SCHOOLS.

**A**N interesting series of reports on "Industrial Education in Germany" is being prepared by United States Deputy Consul Meyer, Chemnitz, Germany, which later on will be issued as a special Consular Report, says the *New York Journal of Commerce*. According to one of these reports recently issued, the German industrial schools, however much they may have been derided and ridiculed by narrow-minded opposition in the primary stages of their development, have proved their worth. They are open, as a rule, not to a class or to a country, but to the world. In their halls rich and poor meet on equal terms as learners. They require comparatively little money, but educate thousands of hands and heads. They are the most powerful weapons of German industry. They are the ironclads of commerce.

The agencies through which the German industrial schools are established and fostered are of widely different character. Sometimes the creating agency is the State, sometimes a guild, sometimes an association, sometimes a commune or town, sometimes a private individual, and sometimes two or many of these combined. In general it may be said that the State participates most largely—or even exclusively—in the establishment and maintenance of those industrial institutions which aim to supply the best and highest grade of instruction, such as the great technical high schools, the commercial high schools (more properly called commercial universities, from the scope and breadth of their instruction), as well as some of the industrial art schools and large trade schools.

Schools of lesser importance are almost invariably organized and maintained by local guilds, industrial associations, or private individuals, with occasional Governmental subsidies, as is well illustrated in Saxony, Hesse, Nassau and Darmstadt. In Baden the industrial schools are, without exception, communal or town (Gemeinde) institutions with State aid.

An enterprising statistician perceived a good opportunity at the industrial school exhibition held at Dresden in 1898 for the collection of data as to the origin of Germany's industrial schools. The greatest diversity was found to exist. The 251 industrial schools which participated in the exhibition were founded by various agencies, as follows: 48 by the State; 47 by guilds; 88 by other industrial organizations and associations; 45 by the Gemeinde, or town; 23 by private individuals.

The State promoted, in the main, the larger schools, the community the minor schools. Experience has proved the wisdom



of preserving the lower industrial schools, and especially their financial administration, as nearly as possible in the hands of the local government or local trade organization. They supply skilled labor for the local industries. One frequently finds large and important industrial schools in comparatively small cities.

A few words as to the curriculum. Drawing is pre-eminently in the lead. It lies at the basis of a large majority of advanced studies and is the A B C in the curriculum of many a trade school.

In mathematics, as in other studies, it is assumed that the student has grasped the fundamentals of the subject. Emphasis is placed upon accuracy, speed and simplicity. In geometry theoretical demonstrations give way entirely to practical applications of geometrical relations. What requires special attention is that in the German trade schools work does not end with the purely technical side of the trade, which would place the graduate at the mercy of his inborn talent (or lack of it) for wise business management, but includes studies which prepare the student for the practical conduct of a business. He gets a good knowledge of production and consumption, cost, prices and market fluctuations in his trade; he learns the system of book-keeping which is most practical in his business; he studies public legislation of importance to the industry with which he has identified himself; and, on the whole, he is given opportunity to acquire a good insight into concrete business relations and trade practice.

At the bottom of all questions of administration is the hard fact of money. German industrial schools are usually compelled to exercise the closest economy, and in many cases they suffer for want of adequate support. Their great number in certain parts of the empire has dissipated energy, divided interest and reduced support.

The incomes of German industrial schools may be conveniently grouped under two heads—internal incomes and external incomes. The former represent the direct earnings of the schools in the form of tuition-fees, entrance-fees and receipts from the sale of products manufactured in the schools and of materials to the students of the institution. The latter represents the financial aid and support given to the schools by the numerous outside agencies, such as the State, city, town, guild, trade organization, Chamber of Commerce or individual. A good illustration of the external income of industrial schools is furnished by the industrial schools of Berlin, which in 1896 had an attendance of 19,120 students and received financial aid amounting to \$104,026 from the following sources: From the city of Berlin, \$78,388; from the Prussian Government, \$20,489; from trade associations (*Vereine*), \$2,980; from guilds (*Innungen*), \$2,169.

It is customary in the administration of the German industrial schools to extract *Schulgeld* or tuition-fees from the students who attend. These fees are comparatively reasonable, and serve a good purpose in winnowing out for attendance those young men who have a firm determination to follow the trade which they come to learn.

The tuition-fees also vary in amount with the different classes of schools, such as technical high schools, commercial high schools, engineering schools, textile schools and other special trade schools. Contrary to the statements of some writers on this subject, who claim that the tuition fees are highest in commercial schools, the writer has found that the textile schools and the higher engineering schools exact the highest tuition fees.

The following figures show the comparative amounts of the annual tuition-fees imposed by the leading schools in the various groups:—

#### HIGHER ENGINEERING SCHOOLS.

Aix la Chapelle.....	\$17.85	Dortmund .....	\$35.70
Altona .....	35.70	Einbeck .....	35.70
Elberfeld-Barmen .....	35.70	Hagen .....	35.70
Breslau .....	17.85	Posen .....	35.70
Cologne .....	47.60		

#### HIGHER INSTITUTES OF TECHNOLOGY.

Altenburg .....	\$61.88	Ilmenau .....	\$57.12
Aschaffenburg .....	52.36	Lemgo .....	52.36
Berlin .....	76.16	Limbach .....	...
Berlin (Elektra Techni- kum) .....	71.40	Mannheim .....	71.40
Bingen .....	57.12	Mittweida .....	71.40
Coethen .....	57.12	Neustadt .....	52.36
Frankenhausen .....	52.36	Stadtsulza .....	52.36
Friedberg .....	57.12	Sternberg .....	52.36
Hainichen .....	57.12	Strelitz .....	85.68
		Zwickau .....	61.88

#### MIDDLE CLASS TECHNICAL SCHOOLS UNDER GOVERNMENT DIRECTION.

Ansbach .....	\$4.76	Goerlitz .....	\$14.28
Augsburg .....	71.40	Hannover .....	14.28
Chemnitz .....	23.80	Hildburghausen .....	52.36
Duisburg .....	14.28	Holzminde .....	38.56
Gleiwitz .....	14.28	Magdeburg .....	14.28

#### MIDDLE CLASS TECHNICAL SCHOOLS UNDER GOVERNMENT AND CITY DIRECTION.

Apolda .....	\$42.84	Gera .....	\$47.60
Berlin .....	23.80	Freiberg .....	.95
Bremen .....	35.70	Mannheim .....	5.95
Bremen .....	119.00	Stadthagen .....	47.60
Eutin .....	27.37		

		For—	
COMMERCIAL SCHOOLS:—		Germans.	Foreign- ers.
Chemnitz .....	\$59.50		\$71.40
Cologne .....	59.50		119.00
Frankfort .....	35.70		59.50
Leipsic .....	19.04		19.04
Leipsic Commercial University:—			
Entrance fee .....	4.76		11.90
Examination fee .....	14.28		23.80

TEXTILE SCHOOLS:—			
Aix la Chapelle, higher textile.....	23.80		119.00
Barmen, higher textile school.....	47.60		252.28
Berlin, higher school for weaving.....	14.28		2.38
Chemnitz, higher school for weaving.....	42.84		95.20
Cottbus, higher textile school.....	47.60		252.28
Crefeld, higher textile school.....	47.60		252.28
M.-Gladbach, higher textile school.....	47.60		252.28
Greiz, weaving school:—			
Saxons .....	35.75		*....
Other German .....	47.60		*....
Mulhausen, textile school.....	14.28		119.00
Plauen, textile school.....	14.28		47.60
Munchberg, higher school for weaving....	23.80		142.80
Reutlingen, higher textile school.....	35.70		71.40
Ronsdorf, school for ribbon making.....	7.14		59.50
Sommerfeld, higher textile school.....	7.14		59.50
Werdau, I. S., higher school for weaving...	47.60		71.40

\* Not admitted.

The tuition fees in the higher engineering schools do not discriminate against foreigners, but are the same for all students. As is evident from the above, the tuition fees discriminate against foreigners only in textile and commercial schools and a few others. A small number of schools exclude foreigners entirely.

The principle of discriminating against residents of other kingdoms or principalities finds the widest application in Saxony. The statistics below, giving the annual tuition fees, show the gradation of fees for Saxons, for residents of other parts of the German Empire, and for foreigners:—

#### GRADATION OF ANNUAL TUITION FEES IN SAXON INDUSTRIAL SCHOOLS.

School.	Saxons.	Ger- mans.	Foreign- ers.
Royal Industrial Academy, Chemnitz.....	\$19.04	\$37.70	\$59.50
Royal Builders' School, at Chemnitz.....	11.90	23.80	47.00
Royal Engineering School, at Chemnitz..	11.90	23.80	47.60
Royal Dyeing School, at Chemnitz.....	11.90	23.80	47.60
Higher School for Weaving, at Werdau..	35.70	47.60	71.40
School for Weaving, Greiz.....	35.70	47.60	*....

\* Not admitted.

In the year 1897 the Prussian Government contributed the considerable sum of 1,428,784 marks (\$340,051) for the support of sixty professional trade schools (*gewerbliche Fachschulen*), while the towns (*Gemeinden*) contributed 744,797 marks (\$177,262). In most cases the town is required to furnish the grounds and building, as well as the main equipment of the school, before subsidies are made for the running expenses. Even in case of the State institutions (*Staatsanstalten*) like the builders' schools (*Baugewerkschulen*), mechanical engineering schools (*Maschinenbauschulen*), and industrial art schools (*Kunst-Gewerbeschulen*) the town frequently pays for a large share of the cost of construction, or even furnishes the entire building.

In Bavaria the industrial continuation schools are town institutions, with considerable incomes from the circles (*Kreise*) and the State. The special trade schools are in part purely State institutions and in part circle institutions with State aid. In 1899 the State paid \$34,034, the towns (*Gemeinden*), \$58,786, and the guilds and other trade organizations, \$4,760 for the support of the industrial schools of Bavaria.

In Saxony no definite rule as to State aid seems to have developed, but those schools which are in need and are receiving substantial support from the towns and from the trades immediately interested also receive State aid. Saxony is said to have developed the principle of an active support by those who are most directly benefited and interested in the success of a school to the widest application. Great economy is practised in the administration of the Saxon industrial schools. It is of interest here to note that Professor Bendell, the Swiss expert on industrial education, says that the many-sided and efficient industrial school system of Saxony was maintained at the small expense of 89 francs (\$17.18) a year per student in 1894, against 126 francs (\$24.32) for the Swiss schools.

#### BOYCOTTING—INJUNCTION—STRIKES.<sup>1</sup>

THIS was a case in which an injunction had been granted against the Building Trades Council of Minneapolis by the District Court of Hennepin County forbidding the Building Trades Council and others to interfere with the business of the complainants. Six separate actions were brought at the same time by different complainants against the same organization, the circumstances being much the same in all the cases. The complainants were employers engaged in the business of installing wires and other electrical apparatus in buildings and doing other such work as was incidental thereto. They had formed an association among themselves agreeing, among other things, not to discriminate in the employment of workmen on the grounds of their membership or non-membership in any labor union. There was no controversy between them and the trades council as to any question except that of the employment of non-union labor. The members of the trades council had declared this employers' association "unfair," and had interfered with the carrying out of some of their contracts and with the securing of others by threatening the customers of the contractors that if they attempted to do business with the complainants they would prevent the completion of the buildings on which such non-union labor was employed. On the appeal to the Supreme Court this court examined the evidence on which the temporary injunction was granted only far enough to determine whether the affidavits fairly tended to support the claims made in the complaints. The injunction granted by the District Court was modified in some respects and as modified was affirmed.

Judge Brown, speaking for the Supreme Court, discussed at some length the principles controlling the use of injunctions in connection with strikes and boycotts, concluding as follows:

"It follows from what has been said that the learned trial court was justified in holding that defendants were guilty of a boycott, and ordering the issuance of a temporary injunction restraining them therefrom.

"We come, then, to the question whether the contention of defendants, to the effect that the order of the trial court is too broad and restrains acts other than of boycotting, is well taken. The order of the court is as follows:

"Said injunction shall specifically enjoin said defendants and each of them, their members, agents, and employes, from in any manner interfering with the business of plaintiffs by means of threats or intimidation, of any kind or nature, directed against the customers or prospective customers of said plaintiffs.

"Said injunction shall specifically enjoin the said defendant council and brotherhood, their members, agents, and employes, and each and every one of them, from interfering with the customers or prospective customers of plaintiffs by threats of any kind or nature, and particularly from notifying such customers or prospective customers and patrons of plaintiffs that plaintiffs are unfair.

"Said injunction shall specifically enjoin said defendant council and brotherhood, their members, agents, representatives, and employes, and each and every one of them, from going upon the premises where plaintiffs are engaged or employed, for the purpose of interfering with the business of plaintiffs, and pursuant

to said purpose, from ordering and directing or notifying men belonging to the various allied unions to desist from work upon said premises by reason of the fact that plaintiffs are employed thereon."

"As already stated, it was proper for the trial court to enjoin defendants from all acts amounting to a boycott, and the question presented is whether the order of the trial court goes beyond this in scope and effect. The first sub-division of the order restrains and enjoins defendants, their members and agents, from in any manner interfering with the business of plaintiffs by means of threats or intimidation, of any kind, directed against their customers or prospective customers. The second sub-division enjoins them from interfering with the customers, or prospective customers, of plaintiffs, by threats of any kind or nature, 'and particularly from notifying such customers or prospective customers that plaintiffs are unfair.' We are of opinion that neither of these restraining clauses, except the part we have italicized, goes beyond or restrains defendants from acts other than boycotting, and were therefore proper. It is immaterial whether contract relations actually existed between plaintiffs and their customers at the time, for it would be just as injurious and destructive to plaintiffs' business to prevent them by such means from obtaining customers with whom they could enter into contracts as to interfere by unlawful threats or intimidation and cause existing contract relations to be broken. It is plaintiffs' business as a whole that the law protects, and not some particular transaction involved therein. If a notification to such customers, actual or prospective, that plaintiffs are 'unfair,' portends injury to them or plaintiffs, and such as to bring the case within the rule against boycotting, it was properly made a part of the temporary injunction. (*Beck vs. Ry. Teamsters, etc.* (Mich.) 77 N. W. 13, 42 L. R. A. 407, 74 Am. St. Rep. 421). Whether such a notification would in any case amount to a threat or intimidation must be determined from all the facts and circumstances of each particular case. Such notice might have special significance in a particular case, and have no meaning in another. But the complaints before us, by which we are controlled in determining the case, there being no finding other than in effect that their allegations are true, contain no allegations that the mere notification of customers that plaintiffs are 'unfair' has any special significance, that it portended injury, or was intended as a threat or intimidation, and for this reason we hold that the court below was not justified in making this an element of the injunctive order. In other respects the provisions of the order must be taken to cover and include acts constituting an unlawful conspiracy or boycott—nothing further—and are not open to the objections urged against them by defendants. As to the third subdivision, we are of opinion that the acts there attempted to be restrained are such as might lawfully be committed, and are not subject to equitable control. It is fair to the trial judge to say, however, in this connection, that the order was drawn by plaintiffs' attorney, as is usual in such cases, and was undoubtedly adopted by him as covering only the case made by the complaints. But it goes beyond this, and restrains acts other than acts constituting boycotting. This particular provision specifically enjoins defendants, their members, agents, and representatives, from going upon the premises where plaintiffs are employed, for the purpose of ordering, directing or notifying men belonging to the various allied unions to desist from work upon the premises by reason of the fact that plaintiffs are employed thereon.

"The authorities, as already noted, very generally hold that a strike is not unlawful, that members of labor unions may singly or in a body quit the service of their employer, and for the purpose of strengthening their association may persuade and induce others in the same occupation to join their union, and, as a means to that end, refuse to allow their members to work in places where non-union labor is employed. (18 Am. & Eng. Ency. Law [2d Ed.] 84.) They may refuse to have any sort of dealings with an employer of non-union labor, singly or collectively; they may persuade and induce their members to join them, and there would seem to be no reason why they should be limited as to the place where they may do such acts. There would be nothing wrongful or unlawful in their going upon the premises of the owner, with his permission, where their associates were engaged at work, for the purpose of notifying or ordering them to desist from work thereon, unless, perhaps, their conduct in that respect be so persistent and annoying to the owner of the premises or contractor as to constitute a nuisance. It is clear, upon authority, that this particular part of the injunctive order goes beyond the limits of the law, and cannot be sustained.

<sup>1</sup> *Gray et al. v. Building Trades Council et al.*, Supreme Court of Minnesota, 97 Northwestern Reporter, page 663.

"It is therefore ordered that the order appealed from be modified to conform to the views herein expressed, and, as so modified, it is affirmed."

## BOOKS AND PAPERS

**M**R. MURPHY has evidently spent a large number of hours at the drawing-board in preparing his monograph on wrought ironwork<sup>1</sup> for the press, and as he regards the result he has every reason to be satisfied with himself not only as an intelligent and industrious collector of desirable data but as a satisfactory performer with the architect's drawing-instruments. There have been a good many books on artistic metal-work published in France, Germany and England, but none, we believe, quite so comprehensive—so far as a single period is concerned—or quite so satisfactory as this, and this fact is due not only to Mr. Murphy's own efforts but also to the admirable way in which the work has been prepared for the market by the publisher, Mr. Batsford, the publisher *par excellence* of English architectural works.

It is rather curious that such publications as this should follow rather than precede an art "movement," when seemingly it is the part of text-books to give instruction to those uninstructed and not to record merely the works accomplished by those who have benefited by instruction procured in some other way, from another source. The interest in wrought-metal work revived some years ago under the stimulus of the arts-and-crafts movement, and it would have been of great advantage at the outset to have had at hand this series of plates, so carefully detailed that working patterns could easily have been made after their indications.

On the whole, perhaps, it is just as well that the book was not ready earlier, as inevitably it would have led to the production of mere lifeless repetitions of the subjects—gates, railings, posts, brackets, etc.—shown in its pages. Now that designers and workmen have, through some years of experience, become habituated to working in the ductile material, it is probable that they can make a better use of Mr. Murphy's work and by drawing inspiration and ideas from this older work can imbue their own designs with some of the spirit that vitalizes the old work of such masters as Tijou, whose metal gates and screens lend such perennial interest to the grounds of Hampton Court Palace and the interior of St. Paul's Cathedral. The illustrations, greatly reduced in size, which will be found elsewhere in this issue, sufficiently attest the skill and discretion of the author, as well as the intrinsic value of the selected examples. To the sixty-odd plates of drawings are added about half as many upon which are grouped five or six gelatine prints, from nature, of gates, gateways and railings, all admirably photographed and printed, and in many cases so artistic and picturesque as compositions of light and shade, as well as of form, that they at least equal in value the work of the author's own hands.



### TECHNOLOGY CLUB OF SYRACUSE.

**O**N January 6th, 1904, the Technology Club of Syracuse was organized at Syracuse, N. Y., with a charter membership of 129, including Engineers, Architects, Analytical Chemists, Metallurgists and Geologists. The object of the organization is the promotion of professional and social intercourse among the members. The headquarters of the club are located at No. 707 Dillaye Building, where rooms have been suitably furnished for library and social purposes. Meetings are held monthly, except during the months of June, July, August and September. The annual election of officers takes place at the October meeting. The following officers were elected at the organization meeting: Prof. John E. Sweet, *President*; Dean William Kent, *First Vice-President*; Mr. Henry C. Allen, *Second Vice-President*; Mr. Edward N. Trump, Mr. John H. Barr, Mr. Edmund L. French, Mr.

<sup>1</sup>"*English and Scottish Wrought Ironwork.*" A series of Examples of English Ironwork of the best Periods, together with most of the Examples now existing in Scotland. With descriptive text. By Bailey Scott Murphy, Architect. Sixty-eight plates of measured drawings supplemented by seventy-two Collotype reproductions of photographs. London: B. T. Batsford. New York: Charles Scribner's Sons. Price \$25 00.

James A. Randall, *Directors*; Mr. Alexander T. Brown, *Treasurer*; Mr. A. Frederic Witmer, *Secretary*.

On June 4th last, the club took a trip over the Auburn & Syracuse Electric Railway to Auburn, N. Y., where several large manufacturing plants and the power-house of the above-mentioned railway were visited. These visits to manufacturing plants are to be made one of the special features of entertainment and instruction.

### THE SAN FRANCISCO CHAPTER, A. I. A.

THE following resolutions were adopted by the San Francisco Chapter of the American Institute of Architects on August 16, 1904:—

*Whereas*, We, the San Francisco Chapter of the American Institute of Architects, a society interested in the development of architecture and art in the United States, did on the 29th day of July last adopt preambles and resolutions called forth by a Notice to Architects issued by the Board of Education of the City of Oakland, California, in connection with a proposed competition for designs, plans and specifications for new school buildings to be erected in said City of Oakland; and,

*Whereas*, The San Francisco Chapter of the American Institute of Architects did in said preambles and resolutions call the attention of said Board of Education to the fact that its Notice to Architects, as formulated, was alike detrimental to the interests of the City of Oakland and to the architectural profession; and,

*Whereas*, The San Francisco Chapter of the American Institute of Architects did tender to the said Board of Education the services of a member or members of said Chapter, to aid and advise said Board of Education, free of remuneration or compensation for such service, in formulating a programme for competition which would be just and fair alike to the City of Oakland and to the architectural profession; and,

*Whereas*, Said Board of Education did not avail itself of professional aid and advice, nor has it changed in any essential particular its Notice to Architects; and,

*Whereas*, The said Notice to Architects offers little of promise to the profession and cannot justify Architects in taking part in a competition so conducted, in that it is calculated for and permits of favoritism and injustice; and,

*Whereas*, There is a recognized method for conducting competitions for the selection of an Architect, which, if carried out in good faith, guarantees satisfactory results; therefore, be it

*Resolved*, That, as in the opinion of this Chapter, an injustice is done the entire architectural profession, we advise all Architects not to enter the said competition for new schoolhouses for the City of Oakland; and be it therefore further

*Resolved*, That participation in the said competition under the present programme and Notice to Architects will be regarded by the San Francisco Chapter of the American Institute of Architects as unprofessional conduct; and be it further

*Resolved*, That a copy of these resolutions be forwarded to the Board of Education of the City of Oakland, to every certificated Architect in the State, and to each Chapter in the United States.

LIONEL DEANE, *Secretary*.



[Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.]

FESTIVAL HALL AND THE CASCADES: LOUISIANA PURCHASE EXPOSITION, ST. LOUIS, MO. MR. CASS GILBERT AND MR. E. L. MASQUERAY, ARCHITECTS.

THE BELGIAN AND BRAZILIAN GOVERNMENT BUILDINGS: LOUISIANA PURCHASE EXPOSITION, ST. LOUIS, MO.

EXAMPLES OF AUSTRIAN IRONWORK.

THIS plate is copied from *Zeitschrift für Bauwesen*.

COLLEGE GATEWAYS, OXFORD, ENGLAND.

THIS and the following illustrations are copied from Mr. Murphy's book, "*English and Scottish Wrought Ironwork*," mentioned elsewhere in this issue.

GATEWAY TO ST. JOHN'S COLLEGE, CAMBRIDGE, ENGLAND.

GENDARMERIE BARRACK, ARCUEIL, SEINE, FRANCE. M. MAURICE A. YVON, ARCHITECT.

THIS plate is copied from *L'Architecture*.

#### Additional Illustrations in the International Edition.

THE PENN MUTUAL BUILDING, MILK STREET, BOSTON, MASS. MR. E. V. SEELER, ARCHITECT, PHILADELPHIA, PA.

ENTRANCE TO THE SAME.

NO. 35 EMSER ALLEE, DRESDEN-BLASEWITZ, PRUSSIA. HERR H. WATZLAINK, ARCHITECT.

THIS plate is copied from *Blätter für Architektur*.

SKETCH DESIGNS FOR UNITED STATES GOVERNMENT BUILDINGS. MR. T. W. PIETSCH, ARCHITECT, WASHINGTON, D. C.



[The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.]

#### ADVERTISING PLACARDS.

TO THE EDITORS OF THE AMERICAN ARCHITECT:

Dear Sir,—Would a clause like the following have a good result in the general conditions of a specification?

"The use of any material advertised on bill-boards, blank walls or in any such manner as to interfere with the civic beauty of the community is expressly prohibited in or about this building."

This might decrease the number of bill-boards devoted to ready-mixed paints, roofings, heaters, etc., which now spoil our enjoyment of the view. I am, sir, H. D. CARTER.

[ALTHOUGH praiseworthy in intent, the clause suggested would be quite ineffective, and moreover, since it seeks to restrain the freedom of contract, would be quite impolitic. A much more reasonable proviso in a contract would be one inhibiting the placing of signs and advertising placards upon the building itself during construction.—EDS. AMERICAN ARCHITECT.]



THE SCOURING OF THE WHITE HORSE.—The White Horse on the Hambleton Hills is known far and wide as a Yorkshire landmark, and for miles around it can be seen standing out in relief against the steep hill on the side of which for years its figure has reclined. Heavy rains and storms have, however, played havoc with the coat of the White Horse, and it greatly needs a grooming. A scheme is now on foot for the scouring of the gigantic figure, and the work is about to be commenced, the farmers in the locality assisting. The horse was carved on a hillside, the property of the Ecclesiastical Commissioners so recently as 1857, the cost being borne by a native of the district, Mr. Thomas Taylor, who had then recently returned from Australia. To reveal the white freestone below the surface two acres of moorland were uncovered, for the length of the horse is 106 yards (86 yards from foot to shoulder and eight feet across the foreleg below the knee). It is therefore of considerably greater dimensions than the ancient and more famous White Horse at Westbury.—*Building News*.

RUSKIN'S PRESENT AND FUTURE INFLUENCE.—Mr. Lionel W. Clarke, writing in *Macmillan's*, observes that Ruskin as an authority upon art has perhaps never stood lower than at the present moment. "The reason for this," he says, "is that the artist of whose work he was the most distinguished and the most persistent adverse critic has lately died. People point with a scornful finger at the man who, though he was never tired of praising Turner, the father of impressionism, could call Whistler, the great impressionist, a coxcomb." The declension of Ruskin's authority was inevitable; it would have come about if Whistler had never existed, for Ruskin's art criticism was hopelessly entangled with irrelevant matters. But just as his opponents have looked confidently for his overthrow as an oracle, so we look confidently for a modification of the attitude now held toward him by most of those who interest themselves in art criticism. He is full of error, but he is full of inspiration. Ruskin is worse than useless

in the world of the hide-bound Morellian, but for those who love a beautiful picture for its own sake he will always have something profitable to say, simply because he will always kindle the imagination. He has a way of moving the reader to a keener appreciation of fine things, he communicates to others the thrill which he has himself experienced in the presence of a masterpiece. That, for too many latter-day critics, seems to be of no consequence whatever. To settle a question of attribution is to them the end of criticism. To interpret beauty to mankind is to perform quite as important a service, and there Ruskin exerts and will continue to exert remarkable power.—*N. Y. Tribune*.

THE ST. LOUIS ART JURORS CHOSEN.—The National Commission has confirmed the nominations of the following jurors for the American Fine Arts Exhibit:

*Illustrations*—Louis Loeb, New York; Howard Pyle, Wilmington, Del., and Mrs. Alice Barber Stevens, Philadelphia.

*Wood Engraving*—Henry Wolf and Frank French, New York; G. T. Andrews, Boston.

*Sculpture*—Richard Brooks, Paris; Daniel C. French, J. Q. A. Ward and Herbert Adams, New York; Augustus Saint Gaudens, Windsor, Vt.

*Etching*—Charles F. Mielatz and James D. Smillie, New York; Joseph Pennell, London.

*Architecture*—S. S. Beman, Chicago; H. Langford Warren, Boston; J. B. Mauran, St. Louis; Walter Cook, New York; Frank M. Day, Philadelphia.

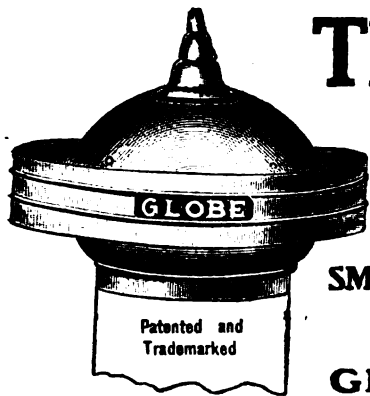
*Applied Arts*—C. Howard Walker, Boston; Lockwood De Forest, New York; Charles P. Davis, St. Louis; Wilson Eyre, Jr., Philadelphia; Ernest A. Batchelder, Pasadena, Cal.

*Paintings*—R. Swain Gifford, Will H. Low, Harry W. Watrous and Francis C. Jones, New York; Seymour Thomas, Paris; Thomas Allen, Boston; Colin C. Cooper, Philadelphia; Edmund C. Tarbell, Salem, Mass.; T. C. Steel, Indianapolis; Ralph Clarkson, Chicago; E. H. Wuerpel, St. Louis; Frank Duveneck, Cincinnati; Cecelia Beaux, Philadelphia; Sarah C. Sears, Boston; Edwin H. Blashfield, New York; Frederick P. Vinton, Boston, and Charles Wiggins, New York.

CEMENT PILES.—The production of what is known as Portland cement is becoming one of the great American industries. Its uses are tending to increase in variety. In Europe concrete railroad sleepers have been tried with success. In the more recent ones a strengthening frame of iron is imbedded within the concrete. Concrete is, in general terms, a mortar made with cement instead of lime. The railroad sleepers do not support the rails directly; wooden blocks are placed between the rail and sleeper to suppress the jarring. In Washington, D. C., concrete piling has been used in the construction of new barracks. The ground was alternately wet and dry, so that wooden piles would not be durable. If the ground is compact, a steel or iron tube with a steel point is driven down to the requisite depth and is withdrawn, and the hole is filled with concrete rammed down. In less consistent soil the tube is provided with a pointed end made of concrete. After driving the tube down to its place, concrete is poured into it little by little, with constant ramming, and the tube is withdrawn as fast as the concrete is in place. In water a thin iron jacket surrounds the tube and is clamped to it. This jacket descends with it. Its lower edge sooner or later reaches impervious soil, when it is unclamped. The inner tube is now driven down to the required depth, and concrete is introduced as described. The thin metal jacket excludes water and is left in place filled with the hard-rammed stone-like concrete.—*Collier's Weekly*.

THE OAK IN A LINE-OF-BATTLE SHIP.—Readers beyond middle life will remember how proud the nation generally was when, upon Sept. 14, 1852, the greatest man-of-war that had ever been built was launched from the stocks. She was named the *Windsor Castle*, but the "Iron Duke" of Wellington dying at Walmer Castle the same day, her designation, at Queen Victoria's command, was changed to the *Duke of Wellington*. This grand "three-decker" carried 131 guns, and during the Russian war, two years later, served as the late Sir Charles Napier's flagship. She never did actual service after the close of that campaign, but lay for years as a receiving-ship in Portsmouth harbor. She has now come into some ship-breakers' hands near Woolwich, and it is instructive, after the lapse of more than half a century, to recollect what a vast amount of English oak was used in her construction. The *Duke of Wellington* was of 3,759 tons burden, or, in displacement, 6,071 tons. The material consumed in her alone represented the produce of 76 acres of oak forest, reckoned at 40 oak trees, each of an average of 100 years old, to the acre—i. e., 3,040 trees altogether. In addition, her mainmast (a superb stick) cost £500 pounds alone, her foremast £380, her mizzen £100, and her bowsprit and jib-boom £220. Under present circumstances really good English oak is comparatively a very scarce material. Had the building of our fleets continued to have been of wood instead of iron, where would our much-prized timber have been to-day?—*Building News*.





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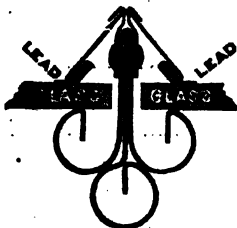
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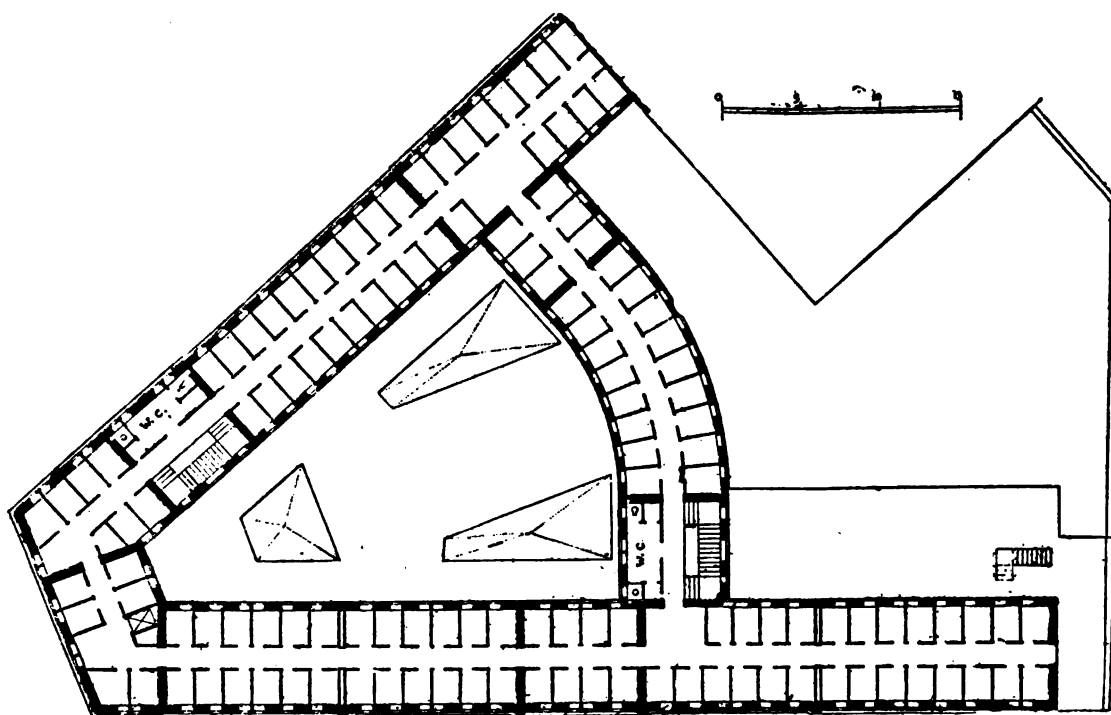


*House of the Musicians, Milan, Italy.  
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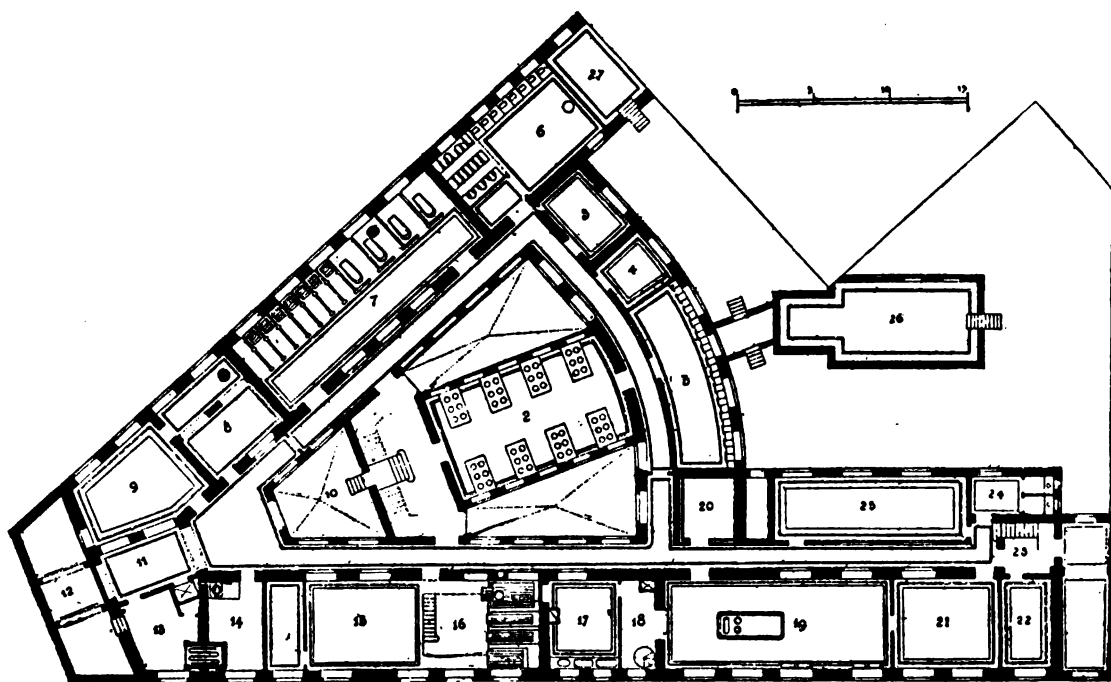
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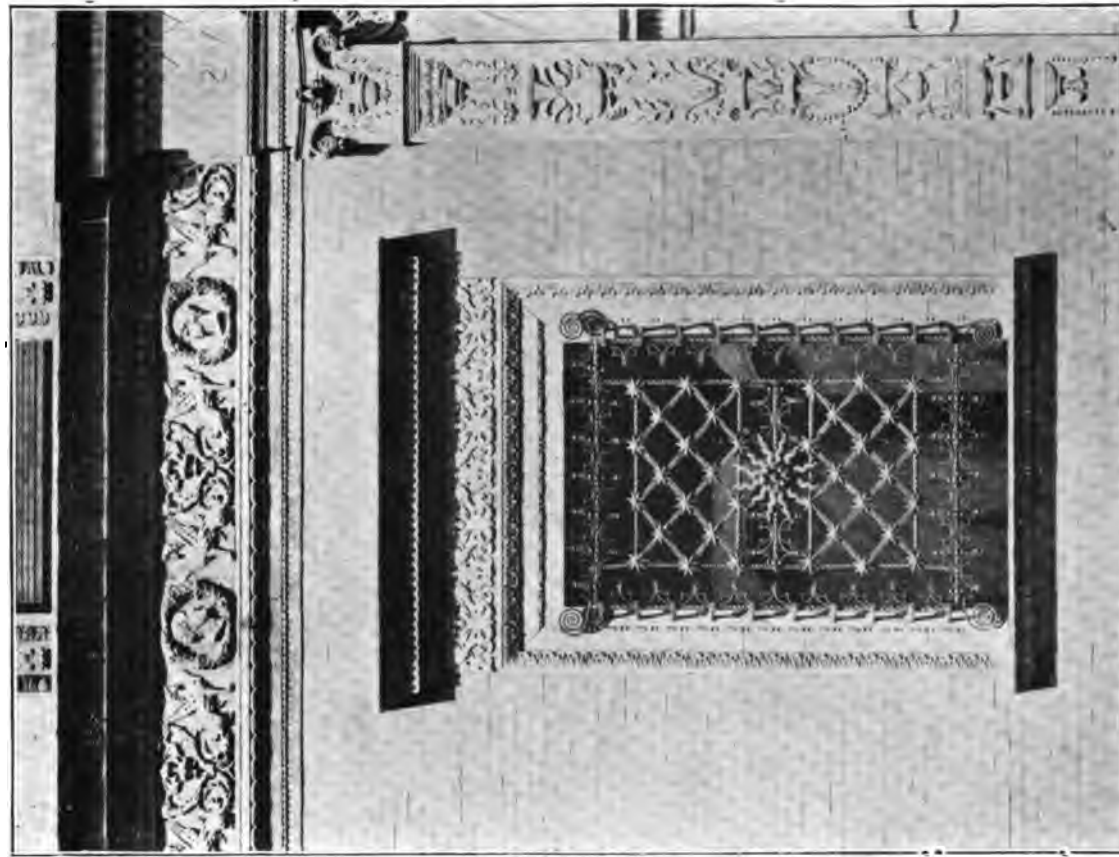
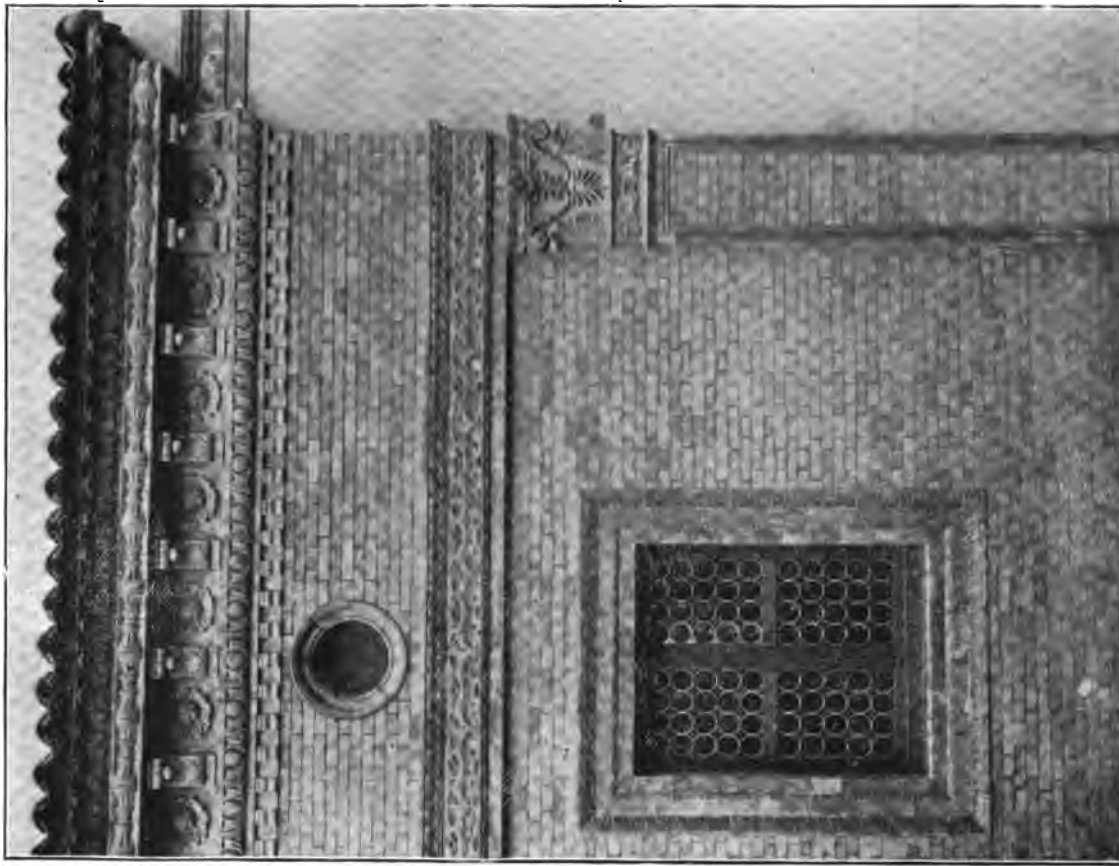






**Palazzo Gonzaga, Milan, Italy.**  
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*Details from House of the Brothers Bagatti-Valsecchi, Milan.  
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# THE AMERICAN ARCHITECT AND BUILDING NEWS

Vol. LXXXV

SATURDAY, SEPTEMBER 10, 1904

No. 1498

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**D**URING the week ending September 25 there will be held at St. Louis, in connection with the Louisiana Purchase Exposition, an International Congress of Arts and Sciences, and architects who may happen to be in St. Louis at that time will do well to ascertain from Mr. Howard J. Rogers, Director of Congresses, just what are the programmes of the several Sections, since it is more than probable that before one or another of them papers of value will be read by men that one would be very glad in after life to have listened to.

**I**F Cleveland, in carrying out its "group plan," is to meet with the same sort of obstruction and delay that now besets its undertaking in the line of public buildings, it will be many a year before that beautiful lake-side city is made yet more beautiful with architectural splendors. As we have already explained, there has been delay and trouble over the United States Government building there which involve court proceedings to settle the question of the use of granite or sandstone for the building, and the new City-hall is proving equally troublesome. There was a very interesting discussion between the municipal authorities in July as to what compensation the architect, Mr. J. Milton Dyer, was to receive, whether he should be allowed to collect five per cent on the total cost, whatever that might finally prove to be, or whether his pay should be limited by contract to five per cent on the million and a half of dollars at which the cost is now fixed. We now forget what decision was finally reached. But Mr. Dyer does not seem to be over sure of any fee at all, since a court has recently issued a temporary injunction restraining him from proceeding with the work. The injunction is granted at the request of Mr. F. E. Cudell, who, though a retired architect, still takes great interest in architectural matters in the city of his residence. Mr. Cudell alleges that, although the City-hall Commission is specifically recognized in the recently adopted Municipal Code, the Commission is an unconstitutional body, and he further alleges that Mr. Dyer secured his contract without the proper competitive bidding.

**J**USTICE DICKEY of the New York Supreme Court, who a few weeks ago ruled that it was beyond the power of a court of equity to enforce the arbitration agreement voluntarily entered into by the trade unions and the Building Trades Employers' Association, seems to have, or make, the opportunity for enunciating most unexpected opinions. Previous to his utterance on the arbitration clause, we fancy that most laymen would have imagined that any agreement voluntarily entered into by two parties, the execution of which did not transgress law or statute, could be enforced by the courts; but it seems this is a mistaken idea. Now, for a second time, if the matter is correctly reported, Justice Dickey enunciates a most unexpected ruling when he declares that the section of the New York Sanitary Code which forbids the emission of black smoke from factory and other chimneys is "unreasonable, in restraint of trade, against public policy and void." We call this a remarkable opinion merely on the supposition that, like the Boston smoke ordinance, the New York Sanitary Code allows chimneys to emit black smoke for five minutes at a time or some other definite short period, and seeks to restrain only incessant or immoderate smoking. The volume of black smoke that can be emitted in five minutes is astonishingly large, as anyone who has timed a smoky chimney knows, and its effect on the atmosphere most prejudicial, and for our part, whether the smoke ordinances are or are not a "restraint on trade," we believe they are none too strict to safeguard the health of the community, a far more important consideration than the saving of a few dollars to the advocates of unrestrained trade. If the learned justice be right about smoke, we wonder what his ruling would be on some other of the sanitary ordinances, those which regulate blasting and the making of noises, for instance.

**I**N order that man might not be wholly off his guard when asleep and, so, defenceless, Nature, which provided a means of perfect rest for the tired eye, allowed only a sort of semi-numbness to the ear and nose. As it is one of the functions of civilized man to improve on Nature's acts so far as practicable, it might be thought that one of the matters to receive early attention would be to provide safeguards against the needless abuse of the defenceless nose and ear. To a very material degree the nose has been cared for, through putting it under the guardianship of Boards of Health, for in no civilized community is there nowadays allowed to endure any nuisance that creates and spreads ill-smelling odors. Anyone whose nostrils are offended can procure either the abatement of the nuisance or collect damages because of its maintenance. But the law has not yet given to the ear as full a protection as it has to the nose, though in a crude way something has been gained: rails and bar-iron can no longer be carted loose and clanging through the streets; machinery that might disturb the occupants of neighboring dwellings at night can be forced to shut down, and elevated railroads have to pay damages.—

once for all—to the owner—not necessarily to the occupier—of abutting premises. But not enough has been done; there are still far too many disturbing noises allowed in our urban life. As ill smells and disagreeable noises can by individual act be prevented from wearing on the sensory nerves only by mechanical means, it is fair that the law should give ear and nose a protection that the eye need not claim.

IT seems more than probable that auditory nerves constantly assailed by brutal urban noises lose their sensitiveness and are not as able to discriminate pitch and tone as nerves that are not so constantly on the rack, and yet the certainty with which a city-bred man will sort out and note a particular noise from the unceasing roar about him seems to show that the nerve is not deadened but merely that the brain becomes inattentive. There is one class of building accidents, however, which may result from an impairment of the hearing faculties of a hoisting engineer. On a large building in course of construction nowadays there are installed anywhere from two to half a dozen or more hoisting-engines, each controlled by its own engineer, who receives his instructions from a whistle in the mouth of a derrick-man, as often out of as in sight. These whistles are usually of the same make, and, so far as we have noticed, seem to be pitched in the same key, and with half a dozen such whistles giving instructions intended for as many different engineers what can be more natural than that now and then an engineer should obey the signal of some other derrick-man than his own and begin to hoist a load before it was properly chained up or lower a block of stone before the masons were ready to handle it. Probably there are slight differences in pitch and tone of the whistles used which the engineer has learned to discriminate, but a careful contractor will take care that the whistles used on the same job cannot be mistaken for one another. The attempt to control the hoisting-engine by electric signal has, we believe, been found practically a failure, as the derrick-men have to give too much of their attention to keeping the flexible electric cord from fouling the disorderly heaps of building-material as they move from place to place as the derrick-boom swings.

THE Board of Education of Oakland, Cal., who have been made the target of the San Francisco Chapter of Architects apropos of their method of conducting a competition for several schoolhouse designs, propose to pursue their own way uninfluenced by any professional outcry. They seem to have, however, some appreciation of their responsibilities and apparently entertain some misgivings as to whether they are really competent to examine and pass judgment on the many designs they count on receiving in answer to their advertisement. They have therefore voted that the Superintendent of Schools shall, during the month that is to elapse before the designs arrive, spend his time in visiting "forthwith the principal Eastern cities, in order to observe and report to the Board the newest ideas in school buildings and accommodations." The idea is an excellent one, but the Board seems to overlook the fact that travelling between Boston and Oakland will consume twelve days and that if their unfortunate Superintendent is to visit and examine thor-

oughly the new schools in merely a few of the "principal Eastern cities" during the remaining fourteen days of the short month of September, he will be likely to return to Oakland a physical, if not a mental, wreck, and be of not much use as an expert adviser when it comes to considering the merits of a possible hundred designs.

THE medical authorities and Boards of Health are disturbed by the steady increase in the death rate from pneumonia with which our urban populations are afflicted. Some authorities are now inclined to class the disease as both infectious and contagious, and are content to deal with it as a disease. Others, who look on diseases as merely the result of conditions that are removable, are puzzled to know how to account for the spread of the disease, but are inclined to attribute it in some degree to the interference with light and air caused by the modern high building. The "sky-scraper" doubtless does affect the health of those who live and work under its shadow, but it might be worth while for the doctors to discover whether their pneumonia patients do not consist largely of occupants of sky-scrapers. There is a very real difference, though not a great one perhaps, between the atmospheric pressure at the ground level and at a fifteenth or twentieth-floor level, and the sudden transportation by express elevator of a pair of weak lungs from one level to the other, perhaps in rapid succession of movement up and down, if the person sought chances to be not at home, must subject them to a very unnatural strain. It is well known that elevator-runners are constant victims to consumption and pneumonia, but this has been attributed to their having to work in a constant draught, whereas their lungs may have been unable to stand the change of atmospheric pressure. Doctors now forbid patients with weak hearts to ride on express elevators; perhaps they may in time come to establish the same rule for those with weak lungs.

WE confess to a feeling of pleasure at reading that the inventors and manufacturers of the Bontempi sculpturing machine—which we take to be the wonderful machine we have seen illustrated in certain periodicals as "sculpting" at the same time an indefinite number of replicas of the same clay model—have been sued because the party who had, up to July 1, an option to buy the machine and patent rights found that the sample machine furnished him would not work as promised, while the givers of the option declined to make it work. Because of this he was unable to sell the property to a third party, and now sues for the money this third party would have paid if the goods had been delivered as promised. The Bontempi machine, if introduced into commerce and "run to its full capacity," as is the way with American machinery, presages untold æsthetic horrors. It may be permissible to have our columns turned in a lathe, our walling stones surfaced in a planer and our mouldings run in a machine; but when it comes to having Bontempi busts and statues kept in stock and ordered by the dozen or score whenever a speculating builder has a fancy to adorn the broken pediment or niches of his house fronts, no matter whether the sculpture scales with the design or no, we feel that art has become altogether too mechanical.



## BRICKWORK IN MODERN ITALY.

JUST as for ancient conceptions in terra-cotta, so for modern buildings of the same kind it is necessary to refer to the North. Of course, I speak here of terra-cotta intended for architectural decoration and in no way of the simple brickwork which is employed everywhere in Italy as constructive material. Our country is rich in clay of every kind suitable for the fabrication of brick, and the clays of Castellamonte in the suburbs of Tinea (Piedmont), Maggiora, near to Novara, Biella, Verona, Figline (Tuscany), San Giovanni à Teduccio, near Naples, Santa Maria di Capua, Squillace, near Catanzaro (Calabria) and Cotronè with us enjoy a certain fame, especially when there is need of refractory bricks.

It should be remarked, however, that the refractory brick of Italy does not resist the highest temperatures, so that for material of that kind resort has to be had to the foreign market. In certain places, as in Liguria, there are used by preference bricks from Marseilles, while in the North a considerable usage is made of English refractory brick.

Thus much premised, it is needless to add that in travelling about Italy we come upon a large number of brickyards, but if you propose a distinction between the brick-kilns for making the simple brick of commerce and the brick-kilns which make artistic terra-cotta, the number is very materially diminished. The ancient centre of art, Italy, even in the matter of brick-making, has entered into the industrial movement, and our manufacturers are not troubled by the burning of artistic pieces. Those of them who are drawn by certain ideals of sympathy along the pathway of art interest themselves especially in terra-cotta intended for decoration; as if these were so many products of mere luxury upon which one cannot count commercially.

Perhaps some of our makers do produce artistic terra-cotta with an industrial success which is not wholly contemptible, but there are very few of them, and they do not find amongst the public the encouragement which would urge them to frequently renew the types of their products and in this way enrich with new models the repertory of architects.

So it happens that there are in Italy makers of terra-cotta who for a dozen years produce repetitions of the same cornices, the same capitals, consoles and vases, who, when reproached with the sameness of their work, reply that there is not any profit in decorative terra-cotta. It was hoped that, in Italy especially, after the Paris Exposition of 1889, terra-cotta work might have taken a new start; that the brilliant and successful application of terra-cotta in the buildings of that exposition might have excited architects to have greater recourse to this material which, after all, contributes to give color to the streets of our grim-colored cities; but this has remained merely a hope, and our makers have continued to produce bricks and other products which are sure of yielding a commercial profit.

Nor, to speak frankly, are the models placed at the service of contractors by the Italian brick-makers in general worthy of any praise. Those who model for these makers are artists of less than mediocre merit, and they give us results that are nearer banality than art. The reason for this is always the same: Our kiln-workers have not the common sense to pay good wages to their modellers. This is the excuse they give and the Italian public responds with indifference and sometimes disdain.

Decorative terra-cotta work becomes artistic in Italy only when executed on private order; then only does the artist modeller prepare for the kilns models which cause us all the more to regret the ordinary commercial output.

To prepare this study on the terra-cotta work of modern buildings in Italy, I have had to see and see over again many things; to visit kilns which I did not before know of; to make inquiries of several of my friends who have had the opportunity of having work executed in terra-cotta, as to what was their opinion on the manufacture of this product; finally, to collect catalogues. My deductions are those which I here set down.

With few exceptions, the production of terra-cotta work in Italy is commonplace, and, from an artistic point of view, far below ancient work. So our makers, even the small number of daring men who push along the way of art, struggling against inertia, know how to give us only old forms; forms, that is to say, copied from the Middle Ages and the Renaissance. One of these artist manufactures, a veritable *rara avis*, is that of the Ditta Celeste Galotti, at Bologna, that ancient city of terra-cotta work. Yet even here the matter concerns models copied from ancient Gothic and Renaissance art, and the "Ditta Galotti" cannot have fatigued itself much over them. Bologna on every side is rich in

these architectural decorations, and since artistic importance must be disregarded here, since merit does not belong to the modern makers, it may be interesting for my readers to know the price of some of this work, and it is only necessary to record that the lira is equal to the fifth of a dollar.

At the Italian kilns there can be bought foliated capitals from ten lire up, ornamented consoles from five lire up, and vases and *putti* at a ridiculous price—the *putti* at fifteen lire or perhaps less, as well as heads of horses, oxen and so forth, from ten lire up. And these Italian kilns make window-finish, complete with consoles and entablatures and jambs, for fifty-five lire, and even less if the window is quite without decoration; in this case they can be had for twenty lire, and from this price up to fifty lire per window, enriched with foliage and ornamental mouldings of any pattern you may desire, subject to the discretion of the maker.

I repeat the words with which I began this paper—to study the terra-cotta work of modern Italy, we must look to the North. So, in this study I have to speak in particular of Milan, Genoa, Turin and Bologna; and Milan and Bologna are at the head of the movement which interests us. But at Milan, for instance, where terra-cotta is in common use, where entire walls are built



CASA BAGATTI-VALSECCHI, MILAN. BROS. BAGATTI-VALSECCHI, ARCHITECTS.

of brick, while elsewhere in Tuscany the walls are made of pebble work, façades of ornamented terra-cotta work are rare, while those with plain brickwork and with brickwork which, forming the main portion of the wall, makes a background for the stone entablatures of windows and doors, are common. Modern Milan has nevertheless seen built two structures entirely of decorated terra-cotta, and amongst its architectural successes boasts a palace called the "red palace," because of the terra-cotta work in which it is clad from base to cornice line; a palace which might have given a new impulse to architectural terra-cotta work in Milan if the æsthetic results had been combined with the admirable resistance of brickwork.

It is an apartment-house of several stories on the Corso Venezia, the Fifth Avenue of the city, and was built in 1859. Everything here is built of terra-cotta—entablatures, windows, balconies, caryatides, even the doors, made memorable by bas-reliefs of bronze color, for the natural red color of the brick did not appear suitable for this feature.

I do not know of any building in Italy where terra-cotta has been more widely made use of than in this building on the Corso Venezia, of which I regret not being able to show any illustrations. Perhaps later I may be able to send a special article

descriptive of the Palazzo Rosso, with several photographs of it in support of the description. Another building entirely of terracotta is much nearer to us than that on the Corso Venezia; one erected by a Milanese brick-maker—Signor Candiani,—with the special object of rehabilitating the Milanese to the extensive use of terra-cotta, to the displacement of simple brick. But Signor Candiani, aided by the architect Broggi, erected his building with-



ALBERGO POPOLARE, MILAN. MAGNANI & RONDONI, ARCHITECTS.

out having attained his end. His non-success may lead our brick-makers to definitely abandon the production of terra-cotta, although his kilns have won an honorable success in this kind of work.

Retracing my steps, I desire to speak of two houses on the Via Gesu where the application of brickwork opens the way to speak of two brothers—Bagatti-Valsecchi—who are among our leading amateurs of terra-cotta work. Admirers of ancient art, but blind, alas! to every impression emanating from modern art, the Bagatti-Valsecchi brothers have erected not only this house, but another where terra-cotta has been given not only a wider, but a more monumental expression. The house on the Via Gesu has two façades where the red of the brickwork has been perfectly harmonized with the warm color of the stone entablatures, window-finish, and so forth.

Whatever artist visits Milan, finding himself near the Bagatti-Valsecchi house on the Via Gesu, cannot merely halt before the façades; he must also visit the interior, for the interior of this house is an inhabited museum. The proprietors are collectors but enemies of the "prisons of art," as M. de la Sizeranne would say. The Messrs. Bagatti-Valsecchi like to have their *objets d'art* a part of their daily lives. So, the furnishing of their house is truly original. Often, in the decoration of some of their rooms they have attained to the level rather of restorations than of renewals. Their architectural activity, their passion for style, has always been dominated by a patient study of adaptation. In this mansion the Bagatti-Valsecchi employed terra-cotta in a very exceptional manner, so that amongst the modern buildings of Italy there are very few that can rival this new Milanese house in all that concerns the use of terra-cotta. For here, far from being mere superficial applications to the walls, terra-cotta has been largely used in the mouldings, ornaments, details, capitals, windows and vases throughout the house; of which, through the kindness of the owners, I am able to reproduce here some illustration. The port cochère alone is of marble; all else is terra-cotta, and embellished terra-cotta at that.

There is another Milanese building where brickwork plays a capital part,—the Albergo Popolare. Simplicity is the keynote of this building, which does honor to its architects, Messrs. Magnani and Rondoni, of Milan, the first city of Italy that has seen such a building constructed. The architectural and social inspiration which created the Albergo Popolare is nevertheless English, for it is the English who, up to the present time, have best understood and solved the problem of healthy and low-cost dwellings in the large cities. The type of these buildings did not exist before an English gentleman, Lord Rowton, interested himself to provide in London decent and economical lodgings for a great number of bachelors or transient visitors to the great city who had not the means to put up at a private hotel.

The "Rowton Houses," so called after the name of their

founder and president of the society which caused their erection, have a general interest from a double point of view—the architectural and sociological; and those who know the Rowton House at Newington Butts, which our English confrère, Mr. H. B. Measures, erected some time ago, will notice the analogy it bears to the Albergo Popolare at Milan. The English building is more agreeable looking, nevertheless, with its *avant corps*, its gables and towers at the extremities, and its motives in terra-cotta in several colors, which have no counterpart in Milan buildings; for multi-colored brickwork is not used in our country. Brickwork, as in the Rowton House at Newington Butts, is also used in the interior of the Milan building, for dados, white brick, relieved with colors and enamelled, which gives an air of cleanliness to the chambers, as such brickwork is difficult to befoul, and, should it become dirty, a damp sponge restores it quickly to its pristine estate.

Pursuing our investigations at Milan we encounter the Museum of Natural History, erected by Signor G. Cerutti. The museum, which is rectangular, covers one hundred and four square metres. Two rectangular courtyards, on the right and left, can, at need, be closed in and receive a portion of the collections. The galleries, which run about the perimeter of the plan, all have the same section, eleven and one-half metres in width by seven and one-half metres in height, and are lighted by large windows three metres above the floor. With this arrangement there can be four rows of showcases having a development of twenty-two hundred metres arranged over a superficial area of fifty-four hundred metres in these galleries. If to these figures are added those of the courtyard, we have to add three hundred metres in length for the showcases and an area of six hundred square metres; in short, we have at Milan, a superficial area of thirteen thousand square metres, subdivided as follows between the two stories: For collections, seven thousand square metres; for atriums, schoolrooms and janitor's rooms, twenty-six hundred square metres; for sub-basement, thirty-four hundred square metres; a total of thirteen thousand square metres. So much for the practical side of the museum; as for the æsthetic side you will notice that in the central portion of the main façade is worked in a pretty movement of arcading, and this arcade motive is repeated in those portions of the building where brickwork predominates. This motive might remind one of the new Museum of Natural History at London, the work of Mr. Alfred Waterhouse, which is, however, much more majestic than that of Sig. Cerutti, but I beg you to note that the application of the motive is different in the Italian building. However this may be, the use of brick at the museum has been quite apropos, for the building has been erected in the Public Garden, and this mediæval



VERDI'S FUNERARY CHAPEL IN THE HOME OF THE MUSICIANS, MILAN. C. BOITO, ARCHITECT.

design erected in the midst of trees produces a very picturesque effect.

The style of the Middle Ages, not absolutely Romanesque, but Gothic liberally interpreted, was the style adopted by Signor Cerutti, architect and writer on architecture, for the building, which, at the expense of Maestro Verdi, was erected at Milan as a retreat for musicians. This is the only structure of the kind

which exists in Italy, and the problem was not an easy one to solve. And since Signor Boito comes from Venice, and the Gothic work of the Home of the Musicians smacks a good deal of the source of origin of its architect, color effects are not wanting in this building which, by means of brick, mosaic, painting and stone from Batticino, Mazzano and Oggiono, presents a polychromatic ensemble, not more on the outside than within. And you will perceive, from the illustration, that the interior of the courtyard, both on the side of the chapel and on the opposite one, is more artistic and successful than the façade itself. Particularly is this true of the portion *vis-à-vis* of the chapel.

The Home of the Musicians was at first intended to have a modest development, for it was designed for only sixty persons, both men and women, and a first scheme was drawn up on these lines, but this first plan was replaced by a second one, more elaborate and providing for one hundred persons, sixty men and forty women in separate apartments. The separation of the two sexes obliged a double and equal development of the plan, requiring two distinct parlors, dining-rooms, etc. This Home of the Musicians, situated far from the centre of the city on the Piazza of Michael Angelo, was finished at about the same time that Maestro Verdi himself died.

Beside the Home of the Musicians there is a building of considerable size, or rather two buildings, wherein brickwork takes a leading rôle. The Palazzo Gonzaga in Milan itself and the Villa Crespi, at Crespi D'Adda in the province of Milan, one quite as much as the other, are inspired from the Lombardic work, and the Palazzo Gonzaga has a vigorous frame and a general air that is quite monumental. Its architect, Signor Arpesani, understood the style which he adopted for this building quite perfectly, and though personally I do not regard with favor architects who seek in the past the forms of contemporary architecture, I must admit that here the architect has drawn an excellent *parti* from the style, handling his brickwork and stonework with much good taste.

An imitation of the mediæval castle, the Villa Crespi is not an archaeological restoration, and Signor Pirovano, just as Signor Cerutti in the Milan Museum, borrowed his mediæval air from the style but gave it a modern expression. Perhaps the reader, after having noticed the manner in which Signor Pirovano composes his building,—the stories, zigzag friezes, crenellated battlements and so on, and raising his eye to the upper story of his tower, will find that the tower itself is somewhat overloaded; that, at least, is my own impression and I believe that if this tower had not borne the polygonal crowning feature the general aspect would have been better. I know that this criticism has been made before, and that even while the building was in execution the architect was recommended to forego this crowning feature of the tower, but he was not willing to abandon it. Perhaps he had his instructions to carry the tower to a considerable height and in respecting the letter of his instructions this is the result. The programme was to erect a tower whence to enjoy the beautiful panorama of the Valley of the Adda, and this valley gains in beauty the higher the observer is. Since we have reached the top we will rest there for the present, at least until I can finish my notes on the modern terra-cotta buildings in Italy, which I trust will be shortly. Then I shall speak of Bologna, Turin and Genoa.

ALFREDO MELANI.

## THE CHANTREY TRUST.

THE select committee of the House of Lords, consisting of the Earl of Carlisle, Earl of Lytton, Earl of Crewe, Lord Windsor, Lord Ribblesdale, Lord Newton and Lord Killanin have agreed to the following report on the Chantrey Trust:—

1. By his will, dated December 31, 1840, Sir Francis Chantrey, R. A., left his residuary personal estate, after the decease or second marriage of Lady Chantrey, in trust for the President and Treasurer of the Royal Academy to receive the income to be "devoted to the encouragement of British fine art in painting and sculpture only."

He further provided that the income of the fund should be applied to "the purchase of works of fine art of the highest merit in painting and sculpture that can be obtained," and that it should be allowed, if at any time thought desirable, to accumulate for a term not exceeding five years.

The President and Council of the Royal Academy, or in the event of the dissolution of that body, of such a society or association as should take its place, were nominated as the purchasing body.

The works of deceased or living artists of any nation might be bought, provided that such artists resided in Great Britain during the executing and completing of such works"; the prices paid for the works were to be "liberal," and wholly at the discretion of the President and Council. But regard was to be had "solely to the intrinsic merit of the works"; and no "sympathy for the artist or his family" was to influence the selection. Neither were any "commissions or orders" to be given for the execution of any works.

The purchases were to be exhibited at the Royal Academy or other important exhibition; and the purpose of the collection was declared to be the "forming and establishing a public national collection of British fine art in painting and sculpture."

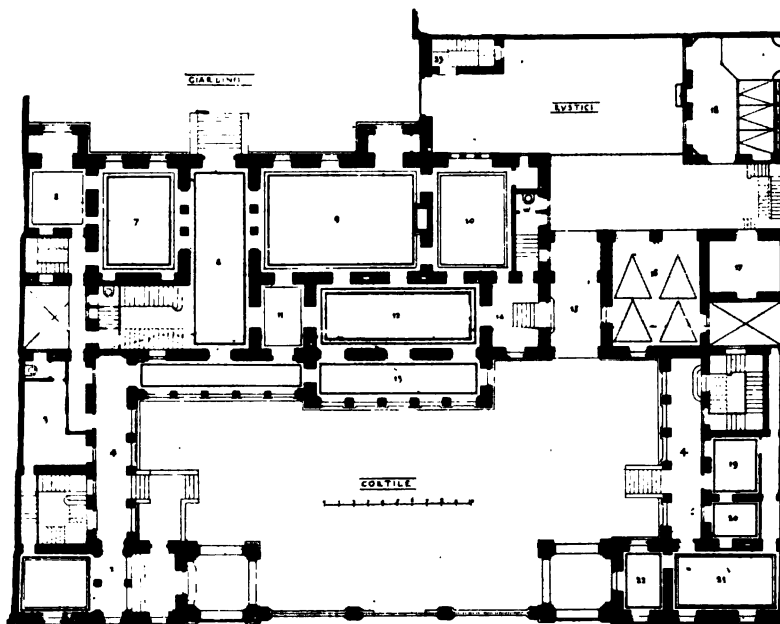
No part of the fund was to be devoted to providing a permanent gallery for the collection, it being the

"confident expectation" of the testator that this task would be undertaken by the Government.

2. Lady Chantrey died in 1875, and in 1877 the first purchases were made under the will. The total capital available amounted to 105,000*l.*, invested in three per cent Consols, since reduced to 2½ per cent, the available income having varied from 2,500*l.* to about 2,100*l.* From 1877 to 1897 the collection was temporarily deposited at the South Kensington Museum and at various provincial galleries, but in the latter year a permanent home was found for it in Sir Henry Tate's National Gallery of British Art at Millbank, and, in accordance with the terms of the bequest, the 85 works purchased up to that date, and all future purchases, were handed over to the Government, who directed the trustees of the National Gallery to house the collection. The trustees have "no power of selection or elimination" of particular works of art. The collection now numbers 109 works, including three exhibited at Burlington House this year.

3. The procedure by which works of art are chosen is as follows: Individual members of the Council<sup>1</sup> for the time being propose and second such works as they consider desirable for purchase. A week's notice is then given of a special meeting, at

<sup>1</sup> The Council of the Royal Academy, for the purpose of buying works of art for the Chantrey collection, consists of the President and ten Academicians, five of whom retire every year. The President has a casting vote.



PLAN OF THE PALAZZO GONZAGA, MILAN. C. ARPESANI, ARCHITECT.

- |                |                   |                    |                  |
|----------------|-------------------|--------------------|------------------|
| 5. —           | 7. Dining-room    | 11. Reception-room | 15. Passageway   |
| 1. Entrance    | 8. Office         | 12. Ante-Saloon    | 16. Coach-house  |
| 2-3. Concierge | 9. Saloon         | 13. Gallery        | 17. Harness-room |
| 4. Porticos    | 10. Billiard-room | 14. Ante-chamber   | 19-20. Workrooms |
| 6. Vestibule   |                   |                    |                  |

which the voting will take place, in order that members of the Council may have time to examine the works proposed. A confidential list of the proposed purchases, with the names of the proposer and seconder and the price of the work attached, is kept during this interval at the secretary's office in the Royal Academy. At the meeting of the Council, after the terms of the will relating to the bequest have been read, a vote is taken as to which work shall be first considered. The work which has obtained a majority of votes in the preliminary ballot is then taken into consideration, and the names of those who vote for or against its purchase, if the work is bought, are recorded in a book kept by the secretary. The purchase of a work of art cannot be made unless at least six votes are given in its favor. By an unwritten custom no member of the Council votes upon a work of art which he has not seen. It will be observed that abstention from voting for this reason has the same effect as voting directly in the negative. No record is kept of works proposed but not accepted, or of those voting for or against such works.

4. These special meetings of the Council for the choice of works of art for the Chantrey Bequest are always held in London at about the time when the Royal Academy Exhibition is opened. It has not been the custom to visit the studios of artists for the particular purposes of the Trust, but individual members of the Council have usually attended other exhibitions open at about the same time. With five exceptions, all the works in the collection have been bought from summer exhibitions of the Royal Academy.

5. The committee have heard much evidence as to the merits of the collection thus formed. So far as possible they have endeavored to restrict witnesses to criticism of a general character, believing that the objects of the inquiry would not be furthered by amassing statements of personal preference for some artists, or depreciation of others.

6. It is admitted by those most friendly to the present system that the Chantrey collection, regarded as a national gallery of modern British art, is incomplete and in a large degree unrepresentative. The works of many of the most brilliant and capable artists who worked in the last quarter of the nineteenth century are missing from the gallery, and the endeavor to account for these omissions has formed one main branch of the inquiry.

7. Critical witnesses have also expressed opinions upon the intrinsic merits of the collection, and the extent to which it can be held to realize the intentions of the testator. It has been stated that while containing some fine works of art, it is lacking in variety and interest, and while failing to give expression to much of the finest artistic feeling of its period, it includes not a few works of minor importance. Full consideration of the evidence has led the committee to regard this view as approximately correct. The collection, in their opinion, contains too many pictures of a purely popular character and too few which reach the degree of artistic distinction evidently aimed at by Sir Francis Chantrey. Less criticism has been directed against the collection of sculpture, which seems on the whole to be more adequately representative.

8. In accounting for this result it is necessary to bear in mind the practice of purchase adopted by successive Councils. They have held that the testator's phrase "encouragement of British fine art," added to the injunction that prices should be "liberal," debarred them from making any purchases except from the artists themselves or from the families of artists lately deceased. The effect of these limitations which successive Councils have thus set upon their scope of purchase has been very considerable. Except in two instances, the first a picture by Mr. W. Hilton, R. A., bought in 1877, the second a portrait of Sir Francis Chantrey by himself, all the purchases have been the work of living artists and have been made from the artists themselves. No work has ever been bought at auction, or from a dealer, although on more than one occasion when a picture which was thought desirable had passed into other hands the buyer was induced to return it to the artist, so that the Council might purchase it from the latter.

9. The Council have been severely criticised for not purchasing the works of various foreign artists who have visited this country and whose influence upon British art has been very considerable.

Evidence has been given to show that efforts, on one occasion at any rate, were made to secure the works of well-known foreign painters; but as a rule successive Councils have held that Sir Francis Chantrey in using the words "of artists of any nation" was influenced by the fact that many artists of foreign birth had settled in England and had become members of the Royal Academy.

The Council therefore contend that they would not be carrying out the wishes of the testator if they bought the works of foreign artists, unless such artists were settled in this country.

10. The Council have also been criticised for neglecting to purchase the work of various schools of art exhibited out of London. It has been stated in evidence to be impossible for the members of the Council, who are busy artists actively engaged in their own work, to travel over the country in search of pictures. One of the results has been that the Council have had no opportunity of considering the work of those Scottish artists who exhibit their pictures mainly in Scotland.

11. The practice which has been adopted of purchasing all works at or about the time when the Royal Academy Summer Exhibition is opened has also been criticised. This custom is apparently due in part to the belief that Sir Francis Chantrey, himself an Academician, contemplated that the great bulk of purchases would be made at the Royal Academy Exhibition; but in part also to the tendency, almost inevitable where so large a body is entrusted with a joint duty, to adhere to the most obvious and simple method of action, even when the conditions which induced such a policy have altered to a considerable extent.

12. In offering some criticism of the past proceedings of the Royal Academy in this regard, the committee desire distinctly to record their belief that there is no ground for any imputation of corrupt or interested motives against that body. They are, however, of opinion that too exclusive a preference has been given to pictures shown at the Annual Exhibition of the Royal Academy, and that insufficient attention has been paid to other exhibitions. The unduly narrow construction placed on certain terms of the will by successive Councils has had unfortunate effects upon the collection, for while it seems probable that Sir Francis Chantrey conceived that purchases would most often be made from living artists, there is clearly no legal bar to other methods of purchase. The committee therefore suggest that a greater flexibility of method, by selection from studios, by purchase from private owners, and even occasionally at auction or from dealers, would largely increase the field of choice, and so tend to raise the standard of merit. The committee are of opinion that any purchases of works by deceased artists should only be made in exceptional circumstances and with great caution. They think it undesirable that any attempt should be made to buy the work of any artist not living at the date when the bequest came into operation in 1877. In cases where a foreign artist has regularly resided in Great Britain, especially when his work has notably influenced artistic production in this country, the committee consider that an effort should be made to acquire a worthy specimen of his art.

13. In considering the completeness or otherwise of the collection regard should be had to the fact that it is housed in the Tate Gallery in company with the modern section of the National Gallery. Consequently, though it is desirable that the Chantrey collection should be representative, it would be unwise to expend so limited a fund in buying the works of artists who are well represented in the same gallery, assuming that the present arrangement of the collection is permanent.

14. But while it appears certain that the Chantrey collection might to some extent be improved by a system of purchase founded on a wider interpretation of the terms of the will, the committee are strongly of opinion that the constitution of the purchasing body, as appointed by the testator, is inherently defective. It seems certain that a committee of ten men, actively engaged in the exercise of their profession, cannot possibly give the requisite time or attention to the search for the particular three or four works of art which it may be considered desirable and possible to buy in any given year. It seems, therefore, necessary to devise some system of devolution to replace a machinery which has become more evidently cumbrous as years have elapsed. Experience has also shown that so large a selecting body, even though changing in composition, is likely to fall into a beaten track of taste, and unconsciously to limit encouragement to the more conventional expressions of artistic feeling.

15. Various suggestions have been offered in evidence for a reconstruction of the purchasing authority.

Some witnesses believe that a satisfactory issue can only be reached by so extreme a measure as the transfer of powers from the Council of the Royal Academy to an independent purchaser, as, for instance, a director specially appointed to purchase modern works of art for the nation.

Others suggest that the one-man power ought to be entrusted either to the President as such, or to some member of the Royal Academy appointed for a term of years.



16. After careful consideration the committee recommend the appointment of a committee of three, for the purchase of works of art in painting and sculpture, composed of the President, *ex officio*, of a Royal Academician appointed by the Council, and of an Associate of the Royal Academy nominated by the body of associates. The elected members should be appointed to hold office for five years, and should not be eligible for immediate re-election.

Regulations should be made by which the principal artistic societies in England and Scotland should be invited regularly to report to this committee, to whom the final powers of selection and purchase should be entrusted, the existence of important works of art.

17. It has been made clear in evidence that the effect of the judgment in *Leighton vs. Hughes* has been prejudicial to the collection. The committee, therefore, recommend that some modification should be effected in the provision of the will which forbids the purchase of incomplete works of sculpture.

18. Successive Councils have invariably adhered to the direction in the will that the works of art purchased must have been executed entirely in Great Britain. By this Sir Francis Chantrey probably intended to discourage artists from living permanently abroad. The committee are of opinion that successive Councils have been absolutely justified in their reading of this provision of the will, but they consider that many desirable works of art must be lost to the collection by reason of the artist's not being able to give an assurance that the work has been executed entirely in Great Britain. The committee, therefore, recommend that the purchasing body be empowered to buy the work of an artist who permanently resides in Great Britain, even though such work may have been in part executed abroad.

19. It is recommended that effect should be given to these provisions either under a scheme of the Charity Commissioners or the application of the trustees, or, if not, by Act of Parliament.

#### WHICH IS THE TRUE VENICE?

EVERY man makes his own Venice, whether he be Ruskin or Turner, Maurice Barrès or Mr. Mortimer Menpes. I read "*La Mort de Venise*" when I was in Venice last, and as I heard "*l'éternel motif de la mort par excès d'amour de la vie*" pass and return and lose itself and re-emerge throughout all these pages, I saw one aspect of Venice, an aspect chosen deliberately, with an ingenious method; here at least was a distinguished, a remote, an alluring, if a trifle sentimental, city. The book which has just come into my hands, "*Venice*," by Mortimer Menpes, text by Dorothy Menpes, (A. and C. Black), is a book containing a hundred color prints, with twice that number of pages of letter-press. The letter-press is chatty and sympathetic; sympathetic, that is, in intention. Of the pictures I am disposed to use the same words. The pictures buttonhole Venice, as the letter-press buttonholes the reader. They are gushing, exclamatory; they give you snapshot after snapshot, so cleverly, so hastily, with such a brilliant splash at simplification! If Venice were really, to many people, like these pictures, what a hot, gaudy, distressing place it would be!

Here, then, is a sufficient contrast to the mist-gray and moribund Venice of M. Barrès. Which is the real place, the place all delicacy of evasion or the place all vulgarity of gloss and glow? I repeat, every man makes his own Venice; and I will try to show that it may be quite deliberately seen through imaginary eyes. What follows is supposed to be taken from the journal of an imaginary person, a neurotic enough creature in whom I am interested just now, who goes to Venice to get well after an illness, and, I believe, dies there.

Surely one gets well of every trouble in Venice, where, if anywhere in the world, there should be peace, the oblivion of water, of silence, the unreal life of sails. I have come to an old house on the Giudecca, where one is islanded—even from the island life of Venice. I look across and see land, the square white Dogana, the Salute, like a mosque, the whole Riva, with the Doge's Palace. There lies all that is most beautiful in the world, and I have only to look out of my windows to see it. Palladio built the house, and the rooms are vast; the beams overhead are so high that I feel shrunk as I look at them, as if lost in all this space; which, however, suits my humor.

The art in life is to sit still, and to let things come towards you, not to go after them, or even to think that they are in flight. How often I have chased some divine shadow, through a whole day till evening, when, going home tired, I have found the visitor just turning away from my closed door.

To sit still in Venice is to be at home to every delight. I love St. Mark's, the Piazza, the marble benches under the colonnades of the Doge's Palace, the end of land beyond the Dogana, the steps of the Redentore; above all, my own windows. Sitting at any one of these stations one gathers as many floating strays of life as a post in the sea gathers weeds. And it is all a sort of immense rest, literally a dream, for there is sleep all over Venice. I have been sitting for a long time in St. Mark's, thinking of nothing. The voices of the priests chanting hummed and buzzed like echoes in an iron bell. They troubled me a little, but without breaking the enchantment, as importunate insects trouble a summer afternoon. Very old men in purple sat sunk into the stalls of the choir, loth to move, almost overcome with sleep; waiting, with an accustomed patience, till the task was over.

Here (infinite relief!) I can think of nothing. I can but sink into this delicious Venice, where forgetfulness is easier than anywhere in the world. The autumn is like a gentle summer; no such autumn has been known even in Venice, for many years; and I am to be happy here, I think.

I have been roaming about the strange house, up-stairs, in these vast garrets paved with stone, with old carved chimneys, into which they have let modern stoves, and with beams, the actual roof-trees overhead; nearly all unoccupied space, out of which a room is walled up or boarded off here and there. Some of the windows look right over the court, the two stone angels on the gateway, and the broad green and brown *orto*, the fruit garden which stretches to the lagoon, its vine trellises invisible among the close leaves of the trees. Beyond the brown and green there is a little strip of pale water, and then mud flats, where the tide has ebbd, the palest brown, and then more pale water, and the walls and windows of the madhouse, San Servolo, coming up squarely out of the lagoon.

Does the too-exciting loveliness of Venice drive people mad? Two madhouses in the water! It is like a menace. I went out in the gondola yesterday on the lagoon on the other side of the island. It was an afternoon of faint, exquisite sunshine, and the water lay like a mirror, bright and motionless, reflecting nothing but a tall stake, or the hull, hoisted nets and stooping back of a fisher and his boat. I looked along the level polished surface to where the sails rose up against the sky, between the black compact bulk of the forts. The water lapped around the oar as it dipped and lifted, and trickled with a purring sound from the prow. I lay and felt perfectly happy, not thinking of anything, nor feeling anything, hardly conscious of myself. I had closed my eyes, and when I opened them again we were drifting close to a small island, on which there was a many-windowed building, most of the windows grated over, and a church with closed doors; the building almost filled the island; it had a walled garden with trees. A kind of moaning sound came from inside the walls, rising and falling, confused and broken. "It is San Clemente," said the gondolier over my shoulder; "they keep mad people there, mad women."

I came to Venice for peace, and I find a subtle terror growing up out of its waters, with a more ghostly insistence than anything solid on the earth has ever given me. Daylight seems to mask some gulf, which, with the early dark and the first lamps, begins to grow visible. As I look across at Venice from this island, I see darkness, and lights growing like trees and flowers out of the creeping water, and, white and immense, with its black windows, and one lighted lamp, the Doge's Palace. Nothing else is real, and the beauty of this one white thing, the one thing whose form the eye can fasten upon, is the beauty of witchcraft. I expect to see it gone in the morning. And the noises here are mysterious. I hear a creak outside my window, and it comes nearer, and a great orange sail comes across the window like a curtain drawn over it. Bells break out, and ring wildly, as if out of the water. Steamers hoot with that unearthly sound to which one can never get accustomed. The barking of a dog comes from somewhere across the water, a voice cries out suddenly, and then the shriek of steam from a vessel, and again, from some new quarter, a volley of bells.

The wind woke me from sleep, rattling the wooden shutter against the panes of the windows, and I could hear it lifting the water up the steps of the landing-place, where there is always a chafing and gurgling whenever the wind is not quite still. I looked out, and, pressing my face close against the glass, I could just distinguish the black bundles of stakes in the dim water, which I could see throbbing under a very faint light, where the gas-lamp, hung from the next house, shone upon it. Beyond, there was nothing but darkness, and the level row of lights on the Riva, and the white walls, cut into stone lacework, of the

Doge's Palace. The wind seemed to pass down the canal, as if on its way from the sea to the sea. I felt it going by, like a living thing, not turning to threaten me.—*Arthur Lymans in the Saturday Review.*

## ILLUSTRATIONS

[Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.]

THE VILLA CRESPI, CRESPI D' ADDA, NEAR MILAN, ITALY. SIGNOR E. PIROVANO, ARCHITECT.

For description of this and the following illustrations, see article "Brickwork in Modern Italy" elsewhere in this issue.

HOUSE OF THE MUSICIANS, MILAN, ITALY. SIGNOR C. BOITO, ARCHITECT.

PALAZZO GONZAGA, MILAN, ITALY. SIGNOR C. ARPESANI, ARCHITECT.

DETAILS FROM THE HOUSE OF THE BROTHERS BAGATTI-VALESCCHI, ARCHITECTS, MILAN, ITALY.

PLANS OF THE ALBERGO POPOLARE, MILAN, ITALY. SRE. MAGNANI & RONDONI, ARCHITECTS.

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## NOTES AND CLIPPINGS

INDIANS REFUSE TO CEDE CLIFF DWELLINGS.—Senator T. M. Patterson, who, at the request of the Secretary of the Interior, went to the reservation of the Southern Ute Indians to interview them on the proposition for the purchase of the cliff-dwellers' ruins in the Mesa Verde country, for the purpose of converting the section into a national park, reports a complete failure of the project. The Senator says that the Indians absolutely refuse to treat with the Government, because they declare they have been so badly treated in the past. They informed him that in 1896 they had entered into a treaty with the Government and sold certain lands, and the Government agreed to bring water to the reservation, which it has failed to do. They also complain of the rations they receive. They told the Senator that they would act as soon as the Government carried out the promises made in the treaty.—*Exchange.*

SOME PRACTICES OF THE GUILD OF PAINTERS.—Mr. F. H. Jackson in his "Mural Painting" toward the close of his volume makes the following interesting note on early studio usage as established by the Guild of the Painters:

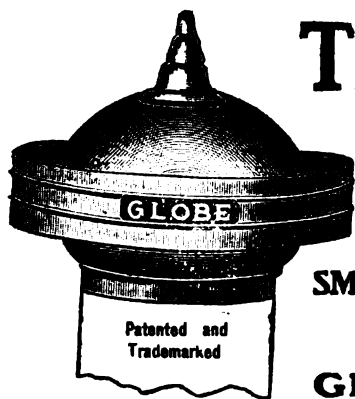
"The most scrupulous honesty was prescribed in the use of colors, and though wags like Buffalmacco might occasionally supply themselves with wine by humorous expedients, it was considered an act of criminal dishonesty, punishable by fine, to employ any but the best colors: 'Any member of the guild who should dare or presume to use in his works any gold, silver or color other than he may have promised to employ—as, for instance, alloyed gold for fine gold, tin for silver, cobalt blue for ultramarine, indigo for azure, red ochre or carmine for cinabrese—should be punished and fined upon every conviction ten "libri."'" Cennini also insists upon the use of good colors as a religious obligation, and most especially in portraying the Virgin. Even if the painter were underpaid for his work, 'God and Our Lady will recompense him in the soul and in the body.' It is scarcely necessary to point out how different all this is from the temper which prevails in the most cultivated art centres among the students of the present day. And most of the fruit produced is of a different kind, which is to be expected from such different roots. In those days, too, the learning of the craft of painting was much more serious than it is now. There was first a year of trial to see if the youth had sufficient promise and industry to

make it worth while to teach him. If the master was satisfied, the boy was then bound apprentice for twelve years. He was sworn never to divulge the secrets of the art till, having become a master himself, he had apprentices, to whom he would then teach them, first binding them by a similar oath to that which had been administered to himself. Now, a few years in an art school is considered sufficient equipment to enable the aspirant to wrestle with the most difficult problems, though, tradition being dead, he cannot have the advantage of having seen those problems approached from different points and solved more or less successfully by his masters."

MINOR FINDS AT KNOSSOS.—Among the objects discovered by Mr. Arthur Evans in last year's excavations on the site of Knossos in Crete, not the least interesting is a cross in colored marble standing on a pedestal against the wall of a little room near the centre of the palace. It has arms of equal length like the Greek cross. The date of the palace is between 1500 and 2000 B. C. Near this cross was a terra-cotta idol, a goddess wearing a tall, conical head-dress, around which a serpent twines, its head surmounting the flat top. Serpents are twined about the waist of the figure and another snake passes up one arm, across the back and down the other arm of the goddess, so that its tail and head rest on the outstretched hands. Her dress is equally curious. She wears a tight-fitting corset cut out in front to show the breasts and over it a bodice; below that an apron which runs down before and behind in a deep curve. The border represents an embroidered Greek curving fret. The long skirt is oval and bell-shaped, made up of numerous plain flounces and an embroidered border at bottom. Her hair shows a bang under the tall tiara in front, but falls in curly masses behind onto the shoulders. Other terra-cotta figurines show the flounced oval bell-shaped skirts, but with larger flounces, also the same effect of corset and bodice. On the wall where these were found hung votive offerings in painted terra-cotta, consisting of garments richly decorated with floral designs, or of belts imitating twisted snakes, or of vases, pots and painted sea-shells. Moulds for the making of such objects were found carved in soft steatite stone. The colors used are a greenish blue, brown, purple and lilac, while the flesh-tints on the figurines are a brilliant milky white.—*N. Y. Times.*

WIND-POWER FOR ELECTRICITY.—In an article in the *Canadian Engineer*, Dr. Alfred Gradenwitz writes of the experiments of the Danish Government in the problem of utilizing wind-power for electrical works, and says that with the dynamo coupled direct to the motor moved by the wind the results have been unsatisfactory, but a simple regulating device has overcome the difficulty. This device consists of two belt discs mounted on a movable arm bearing a counterweight. One of these carries a belt from the wind motor and the other one from the dynamo. The resulting tension of the belt from the wind motor is kept constant, depending on the weight of the discs and the counterweight. Any surplus energy developed by the wind motor is lost as heat with the friction of the belt. The current from the dynamo is used to charge a storage-battery. Between the dynamo and the battery is interposed a switch. This is closed automatically when the current intensity is not inferior to its normal constant value. When the wind is sufficient, and the battery nearly discharged, the dynamo will run at a speed sufficiently high to charge the battery with the normal current of a dynamo. As the charge increases the dynamo will automatically increase its speed and load so as to make the charging current constant. Only in exceptional cases will a cell controller have to be resorted to in charging. For instance, if the charging and discharging in the battery are taking place simultaneously. An electrical regulating device disconnects the dynamo as soon as the current decreases below the normal number of amperes. This arrangement prevents the accumulator battery from discharging through the dynamo when the strength of the wind is small. This regulator will automatically insert the current when the wind again assumes a sufficient strength. A small plant arranged in this way has been operating at Askov and supplying the inhabitants surrounding it. As a reserve in case of low wind, a gasoline engine has been installed. The plant thus far has been satisfactory, and has brought in a net revenue of 12½ per cent on the original investment.

ANOTHER MEMORIAL TABLET TO GILBERT STUART.—There has lately been placed in St. Paul's Church, Wickford, R. I., a tablet which reads thus: "Sacred to the memory of a native of Narragansett, Gilbert Stuart, son of Gilbert and Elizabeth Anthony Stuart, born at the old snuff-mill, North Kingstown, Dec. 3, 1755; baptized at St. Paul's Church, Palm Sunday, April 11, 1756; died after a life full of honors at Boston, July 27, 1828. The painter of George and Martha Washington, of Adams, Jefferson, Madison and Monroe, of George III of England, and of his son, afterwards George IV, his incomparable portraits have given him a chief place in the history of American art. Erected by public subscription, A. D. 1904." The list of subscribers contains many well-known Boston and Rhode Island names. Stuart's Presidential series might have included John Quincy Adams.—*N. Y. Evening Post.*



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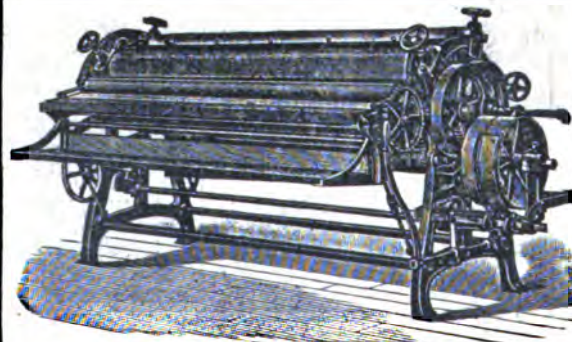
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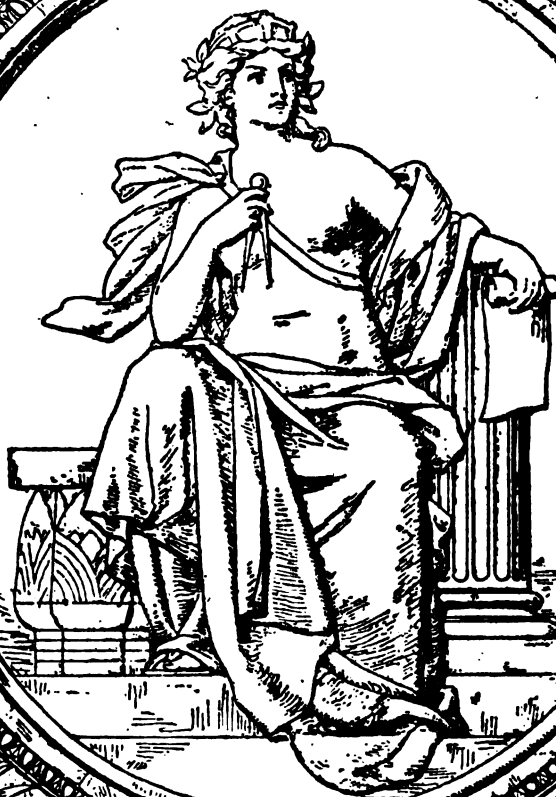
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House of Prof. Max Littner, Architect, Munich-Bogenhausen, Bavaria.

From Deutsche Bauzeitung.







***"Science": Model for Group on the Palace of Manufactures: Louisiana Purchase  
Exposition, St. Louis, Mo.  
George E. Bissell, Sculptor.***





[1876]

*Old Houses, Lüneburg, Hanover.*



[1630]









1. The first part of the document is a list of the names of the persons who were present at the meeting.

2. The second part of the document is a list of the names of the persons who were absent from the meeting.

3. The third part of the document is a list of the names of the persons who were present at the meeting.

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THE  
FEDERAL BUREAU OF INVESTIGATION  
UNITED STATES DEPARTMENT OF JUSTICE  
WASHINGTON, D. C. 20535  
MEMORANDUM FOR THE DIRECTOR  
SUBJECT: [Illegible]

[Illegible]

[Illegible]

# THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. LXXXV

SATURDAY, SEPTEMBER 17, 1904

No. 1499



## SUMMARY:—

The Action of the Graduates of the Massachusetts Institute of Technology on the suggested Harvard-Technology Merger.	
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THE consequence of the suggested merger of the Massachusetts Institute of Technology with the Lawrence Scientific School of Harvard University is a determined effort on the part of the graduates and friends of the Institute of Technology who do not favor the idea to raise two funds, one for immediate current expenses and the other for a permanent endowment. Whatever may be the ultimate fate of the merger proposition—and it will probably have a negative result—there can be no doubt of the wisdom of the attempt to provide both of these funds, and there should not be any great difficulty in securing them. The Institute is unquestionably worthy of generous support, not only from its graduates but from the entire manufacturing interests of the country, which are benefiting by the heads and hands it has trained. There is not a railroad in the country, there is hardly a mine and there must be relatively few mills and factories which have not at one time or another employed Technology graduates, and they might properly be approached with a request to contribute to the endowment fund, and we believe that few of them would decline to make at least a modest contribution. If we assume that each of the five thousand Technology graduates worked in five different employs before reaching his present fixed position, and if each of those employers could be induced to contribute two hundred dollars, an endowment fund of five million dollars could be raised without burdening anyone greatly. Doubtless the present effort will meet with considerable, perhaps with fully effective, success, but it seems to us that, in view of the size of the task and the magnitude of the interests, it would be well to pay some trained organizer and persuasive pleader to adopt the role of *frere queteur* rather than to leave it to amateurs, such as the committee of class-secretaries.

EVERYONE knows that there is no institution of learning that pretends to keep up with the advance of knowledge which can support itself on its income from tuition-fees, so it is not surprising that the annual cost of instructing each pupil at the Institute of Technology exceeds by about one hundred and fifty dollars the amount he himself pays for tuition. This is not so unusual a condition as to excite surprise. But it is astonishing, in view of the vast importance of the work it has accomplished, to learn that the Institute's funded property is only about eighteen hundred thousand dollars and that of this amount only one million dollars is unincumbered with specific conditions so that its income can be used for general running expenses. It speaks volumes for the financial ability of the management that the deficit for the past year was not more than thirty-seven thousand dollars.

DR. GEORGE T. MOORE, of the Department of Agriculture, has become a benefactor of water-companies and their customers through proving by a long series of experiments that water made unpotable by the presence of algæ can be made safely potable by moderate doses of sulphite of copper applied at the reservoir or well. There seems to be no question about the efficacy and safety of using sulphate of copper for this purpose, but whether it will be equally safe to use the salt in stronger doses, as Dr. Moore recommends, for the destruction of typhoid bacilli is a matter upon which, just now, the medical profession and Boards of Health are seriously at odds. Dr. Moore's experiments have proved that water infested with typhoid-fever bacilli can be made potable, so far as the further harmfulness of the bacilli is concerned, by a slightly stronger dose of the salt than is needed to kill the algæ, and he is positive that the presence of the salt in such small quantities cannot be prejudicial to the consumer's health. In fact sulphate of copper is used by physicians in cases of intestinal disorders, and the Chinese use copper kettles to keep off the "cholera devil." At the same time it is an almost universal kitchen myth that copper cooking-utensils, once the tinning is worn off, must be discarded, and yet, when one thinks about it, one must realize that ships' "coppers" are not likely to be retinned frequently, and that sailors are not the less healthy for having their food cooked in copper vessels pure and simple. If Dr. Moore has really discovered a bactericide that can be used safely, the long and costly suit of St. Louis against the Chicago Drainage Canal can be dropped where it is without reaching a decision.

THE New York Superintendent of Buildings is urging the Board of Aldermen to adopt the clause he offers in amendment of that section of the Building Code that affects elevators, and we hope the amendment may be adopted. The registration and licensing of elevator-runners, one of the ends aimed at, can certainly do no harm and probably will lead to the rejection of obviously irresponsible persons, although we believe that it is rarely that the elevator-runner is

the responsible cause of an accident. A much more important provision is the placing of freight-elevators, as well as passenger-elevators as now, under the supervision of the Building Department, not only as regards installation, but as regards operation, inspection and alteration. The new section would be improved by containing a requirement that each freight-elevator should carry a notice declaring with what load it may safely be burdened, as well as the warning, actually provided for, that persons ride on freight-elevators at their own proper risk. The present very general practice of leaving freight-elevators to be operated by any casual teamster or expressman who has need of them is distinctly dangerous, is the cause of many accidents and ought to be prohibited. Besides, the opportunity is always offered to the passing hoodlum to reach in to the open shaft and set the elevator in motion, regardless of consequences.

**F**AIRMOUNT PARK, Philadelphia, is one of the successful great parks of the country, and, though at present rather far from the dwelling place of the masses to be of the greatest popular use, is accessible to all who can spare the price of a trolley ride. The engineer or landscape architect who laid out the park, Mr. Emil Mahlon, died late in August at the age of fifty-three. As his name indicates, Mr. Mahlon was a German, and was trained at the Polytechnic School in Dresden. For many years he was employed as topographical draughtsman in the Hydrographic Office of the Navy Department, in fact most of his life work was done in that office, although for several years he was in charge of the park system of Louisville, Ky. Another landscape architect, Mr. Aneurin Jones, a Welshman by birth, has also died recently at the age of eighty. At various times he was in charge of Central Park, New York, and Prospect Park, Brooklyn, and each time had to be retired because of public clamor at his doings in office. He had a penchant for opening up vistas, and in so doing cut down many fine trees; but this does not prove that he was wrong, for a similar public clamor assailed Mr. Olmsted a few years before his death in consequence of his authorizing a pretty serious thinning out of trees in Central Park, the judiciousness of which measure is now apparent. Mr. Jones may have been equally right in opening up his vistas even with the sacrifice of fine trees, but there certainly was no wisdom in his issuing an order that artists should not be allowed to sketch and paint in the parks because they "trampled down the grass."

**T**HOSE who took part in the agitation to preserve the Palisades from destruction by quarrymen seeking road-material and aggregate for concrete take much satisfaction in now and then hearing rumors of what is actually being accomplished by the Interstate Park Commission in charge of the operation. The Commission has disbursed nearly three hundred and fifty thousand dollars and has yet more to pay in securing title to the one hundred and seventy-five thousand acres of land that are to constitute the Interstate Park, stretching along the brow of the Palisades for fourteen miles and overlooking the Hudson River below. Like the International Park at Niagara, it is

the intention to treat this as a natural park, and beyond the construction of a boulevard running from one end of it to the other, the engineers and landscape architects will do little that will interfere with the present natural features.

**B**USINESS MEN are rather given to holding in light esteem the "references" furnished by clergymen that may be offered by seekers for employment, partly because they do not greatly value a clergyman's knowledge of what constitutes desirable qualities in business life and partly because they know that clergymen are rather prone to "draw it strong" and say rather more than ought properly to be said. Apparently Signor Biondi's lawyer holds the clerical opinion in higher esteem, as he is said to have procured from Cardinal Satolli an opinion to the effect that the "Saturnalia" is of sufficiently good moral character to be seen in company with the "Bacchante" and divers nymphs, satyrs and nudities on daily show at the Metropolitan Museum of Art. Naturally this statement has excited other reverend gentlemen, who probably know as much about morals but less about art than does the Italian Cardinal, to take the other side and combine in protestation against the public exhibition of the group. Meanwhile the Museum seems to have been brought into a truly unfortunate position, for not only it must defend, or compromise, the sculptor's suit, but actually at the moment may be called upon by the Government to pay the bond, already technically forfeited, which it gave when it secured the group at the close of the Buffalo exhibition.

**L**IKE other, like too many other, colleges, Washington University, at St. Louis, has its department of architecture, and though at the end of its second year it has only five students enrolled in the department, it promises to accomplish the ends which its projectors had in view. But besides this, it seems to be accomplishing in an incidental way a wider work of even greater value than that for which it was specifically organized. To establish an educational department implies the extending of an invitation to young people to come and take advantage of its opportunities, and this in turn implies the probability that a certain number will accept the invitation who would be more successful in life if they had not been induced by the invitation to embark on a career for which they were really unsuited, a career which they would never have thought of undertaking had it not been for the invitation. To give educational aid, on the other hand, to those who have already embarked on a career and feel the need of such aid is quite another, and, we feel, a really more useful undertaking, and this work the new department of architecture at St. Louis is accomplishing, and is setting an example that is well worthy of imitation. For the benefit of draughtsmen working daily in offices, it has opened an evening class in design under the charge of Mr. Louis C. Spiering, a graduate of the École des Beaux-Arts, which has proved very popular and seems to be doing good work. We believe that this is the first instance of a college department undertaking, in an organic way, a work for outsiders which is usually left to the uncertain care of the architectural clubs and draughtsmen's societies.



THE ART OF THE FRENCH RENAISSANCE.<sup>1</sup>

THE sixteenth century is perhaps the most attractive period in the whole of French history; and a complete account of the art of the French Renaissance might naturally be looked for from French historians. Much excellent work has indeed been done by archæologists since the middle of the last century; but, as one of the ablest and latest of French writers remarks, the history of this period has yet to be written. Its study is in fact attended by peculiar difficulties. There are lamentable gaps in the evidence. France has suffered from wanton destruction far more than England. With the exception of Nonesuch, and a few other mansions that can be counted on one's fingers, nearly all our great historical houses of the sixteenth and seventeenth centuries have survived to the present day; but in France probably half of the finest examples have either disappeared altogether, or have sunk to base uses which, more or less completely, obscure their original purpose.

The chief architectural effort of the Renaissance in France was concentrated on house-building; and great houses, as belonging to the privileged classes, were the first to suffer from the French revolutionaries. What is far less intelligible, however, is the callous indifference shown by the French aristocracy themselves long before the Revolution. They do not appear to have attached the slightest importance to their hereditary dwelling-places. It was not merely that they pulled them down or "cut them about" to make way for modern improvements, but that they were strangely ready to sacrifice any one of them that showed a reasonable prospect of conversion into cash. A prince of the great house of Condé destroyed, in 1799, the Chateau of Fère-en-Tardenois, probably an early work of Bullant's. In 1780-82 the same nobleman had the entrance to Écouen pulled down, and sold the Chateau de Creil for old materials in order to save the cost of maintenance. So early as 1719 the Regent ordered the destruction of the Chapel of the Valois as the cheapest way of finishing it off. The demolition of the Chateau de St. Maur, one of de l'Orme's principal works, was also due to the Condé family; and, though the Chateau de Madrid was in fact destroyed during the French Revolution, Louis XVI had actually ordered the sale of it for old materials in 1778, together with the Chateaux of Blois, Vincennes, and La Muette.

Another cause that contributed to the ruin of many of these palaces was the curious improvidence of the royal builders. They seemed to build for the sake of building, without care either for completion or maintenance. Francis I ordered a palace, or a hunting-box on a scarcely inferior scale, wherever his fancy took him, but he seems to have lost his interest in the building before the roof was on; and du Cerceau remarks that his buildings were often left to perish for want of a slater to patch the roofs. Catherine de' Medici was possessed by the same mania for building on an impossible scale. The Chapel of the Valois, in some ways the most monumental effort of French architecture of the sixteenth century, was never completed. After barely starting the Tuileries, she dashed off into the costly undertaking of the Hôtel de Soissons; but neither building was finished when she died. The Tuileries was destroyed by the Commune; and the only vestige of the Hôtel de Soissons is Jean Bullant's forlorn-looking column attached to the wall of the Halle aux Blés.

After Catherine's death there was a lull for a time. The work that followed in the first half of the seventeenth century was admirable in quality, rather than abundant in quantity. France was holding its breath for the colossal enterprise of Louis XIV. If the country had suffered from the caprice and uncertainty of Francis, it suffered no less from the inexhaustible vanity of the "Roi Soleil"; and there was added to the national burdens the monstrous cost of Versailles. This seems to have terminated the royal efforts at building; and a hundred years later the French Revolution made a clean sweep of everything that it did not need for itself.

Had it not been for Alexandre Lenoir we should be even worse off than we are. When the French Revolution was at its height, Lenoir went about searching for such fragments of sixteenth century art as might have survived the storm, paying here, entreating there, doing a work of inestimable value to future generations. From an architect named Jullien he bought, for 440 francs, the column to Henry III, now at St. Denis. He saved the frontispiece of Anet and the gateway of Gaillon, now in the École des Beaux-Arts; the fragments of the screen of St. Germain l'Auxerrois; the altar of Écouen, now at Chantilly; what

was left of the fountain of Diana at Anet, and other priceless fragments. Lenoir stored his salvage in a museum now occupied by the École des Beaux-Arts in the Rue des Petits Augustins; and from this museum the sculpture was subsequently transferred to the Louvre, and in certain cases to its legitimate owners. It is true that Lenoir put his fragments together in a fashion that somewhat resembles Wyatt's treatment of the tombs at Salisbury; nevertheless his name should be gratefully remembered as that of the man who had the courage to preserve these links with the past at a time of the most terrific iconoclasm the world has ever seen. In the galleries of the Hôtel Carnavalet there is a portrait of Lenoir, a shrewd, kindly face in suggestive proximity to the ill-omened countenances of Danton, Marat and Robespierre.

An unfortunate phase followed the first Empire. Napoleon I wrote his hand in very legible letters on certain of the royal palaces; but, when the Bourbons returned, their object was to revive the associations of the old régime; and with this idea they embarked on a wholesale course of restoration, with the most unhappy results. The methods of French architects when engaged in restorations are painfully familiar. Their principal object seems to be to transform the growth of centuries into a brand-new building of the style and character of what the architect arbitrarily selects as the original design. Viollet-le-Duc's work at Pierrefonds and elsewhere shows the extreme point of futility to which this theatrical instinct can be carried. Much of Fontainebleau is unreadable on account of the restoration made by M. Alaux to the taste of Louis Philippe. St. Germain-en-Laye is still in the hands of the architect; and it has now been denuded of any artistic and historical interest that might have survived from an unfortunate past.

Thus, by the middle of the nineteenth century, however much interest was felt in the work of the earlier Renaissance in France, it was difficult to arrive at authentic historical facts. A good deal of plausible speculation was indulged in; large attributions to Italian artists were made; and the history of the period was written chiefly by guess-work. In 1842 Callet, an antiquary of some note, came across a MS. in the Bibliothèque Impériale, and published his new facts in an historical notice of the life and works of certain French architects; but, according to Berty, he drowned his facts in a deluge of his own invention, and his pamphlet is quite untrustworthy. The first serious effort toward an historical account of the French Renaissance was made by the Marquis Léon de Laborde in his "*Renaissance des Arts à la Cour de France*" (1852-55). M. Berry published in 1860 his "*Grands Architectes Français de la Renaissance*," a rare and very useful little book, now out of print. Meanwhile, elaborately illustrated monographs, such as M. Pfnoir's works on Anet and Fontainebleau, Reveil's "*Jean Goujon*," and others, appeared from time to time; but for the historical student the scientific study of this period dates from the issue in 1877-80 of the "*Comptes des Bâtimens du Roi, 1528-1571, suivis de documents inédits sur les châteaux royaux et les beaux-arts au XVI siècle*."

The evidence presented by these records is unassailable. Together with such records as the "*Comptes des dépenses du Chateau de Gaillon*," published by Deville in 1850, the works of du Cerceau and Philibert de l'Orme, and the comparative study of the buildings and monuments themselves, they form the chief materials available for the history of French art in the sixteenth century. The vague conjectures of earlier writers have given way to uncontroversial facts; but, as will appear, the history of the French Renaissance is not yet sufficiently advanced for a final and authoritative statement. Serious differences of opinion exist between French critics. M. Dimier and M. Palustre, for instance, take exactly opposite views of the same group of facts. Much has yet to be done in the way of sifting and interpreting the evidence; and the very abundance of the material collected by the able French writers who have studied it makes the study of this period somewhat bewildering.

Since 1877 the chief efforts of the foremost French scholars have been directed to checking off the historical monuments of the Renaissance by the evidence of such documents as the "*Comptes des Bâtimens du Roi*." In 1879 M. Léon Palustre began the issue of his monumental work on the Renaissance in France. His scheme aimed at giving a complete account of the first hundred years, with illustrations drawn from every part of France. The first volume deals with the North and the Ile de France; Volume II, published in 1881, completed the Ile de France and Normandy; Volume III, issued in 1885, includes Brittany, Maine, Poitou, and Charente. At this point the work was broken off, and has not been resumed. That in a treatise of this magnitude there should be inaccuracies, and that some of

<sup>1</sup> Extract from a paper by Mr. Reginald Blomfield in the *Quarterly Review*.

if the Niagara River is deepened, will be extended almost to the brink of the Falls themselves, affording 20 miles of sheltered dock front.

The day will come when we shall see a steamless city, reaching unbroken from Buffalo to the Falls, the industrial triumph of Niagara's power.

#### THE MANUFACTURE OF PEAT BRIQUETTES.

**T**HE peat fuel industry has been left to a large extent to individual enterprise, mostly in rural districts of Germany, Netherlands, Scandinavia, Russia and Ireland, and any statistics that have been issued on the subject are untrustworthy. The use of peat as fuel in Germany dates back to the earliest history of the Teutonic tribes. The peat bogs cover very extensive areas in the northern temperate regions of Europe and America. The German peat area is estimated to be about 11,000 square miles; and peat is utilized for hygienic purposes, for manufacture into paper-stock, cardboard, felt, alcohol, etc., for burning in gas generator furnaces, and for manufacture into peat coke, peat slabs and carbonized briquettes. The manufacture of peat slabs has been practised in a crude way by peasants in the north of Germany and in Holland for more than a century, for the purpose of obtaining a cheaper and more efficient fuel than wood or cut peat. During the past fifty years this industry has been placed on a more intelligent basis, due chiefly to the solution of the problem of a cheap production on a large scale. At the present day machine peat is made which stands transportation and the influences of weather, and in many localities even competes with coal. According to a report by the American Institute of Mining Engineers, the method of making machine peat is entirely automatic, the machinery for cutting the peat, elevating it to the press, and conveying the slabs to the drying ground being mounted on a truck which travels into the bog sometimes under its own steam. This arrangement is made for a capacity of from 50 to 80 tons in 24 hours, and costs from £800 to £1,200 at the factory. The truck travels on rails, and the bog is gradually exhausted by cutting each new trench next to the one just completed. An excavating elevator drops the raw peat into the machine where it is disintegrated, kneaded, and forced through a mouthpiece in the form of an endless plastic band, upon a truck on which it is cut, by a series of adjustable knives, into any desired lengths. The pressure required is very slight, and, as no water escapes, the chemical composition of the raw material is unchanged. The volume of the peat is reduced about one-half, and the slabs, when thoroughly air-dried, weigh from 40 to 60 pounds per cubic foot. One man is employed for every two or two and a half tons of peat briquettes produced. While the raw peat contains as a rule between 80 and 90 per cent of moisture, the air-dried slabs have seldom more than from 15 to 25 per cent. To effect a more thorough drying, large hot-air chambers are used. The cost of making machine-peat in Germany is from three to four shillings per ton at the outset, which allows a considerable depreciation for the machinery. This figure is taken from the Schilt Works, near Oldenburg, and from the Ranbow Works, near Langen, on the Elbe. There is a peat bog at Magdeburg, which yields annually about £540 worth of machine peat per acre, while the cost of manufacture is but £180, thus leaving a profit of £360 per acre. The average depth of this bog is 40 feet. The experience gained with the use of press-peat as locomotive fuel in Bavaria, Austria, Sweden, Russia, and Ireland, is stated to be very satisfactory. The utilization of dried press-peat for gas-making and as a substitute for coal and charcoal is also stated to be satisfactory. The problem, to produce from a poor grade of fuel containing from 70 to 90 per cent of moisture a briquette which can compete with coal, or can make up deficiencies in the fuel supply, is a very serious one. Huge masses of raw material have to be handled and cleansed from foreign matter, and tons of water have to be expelled in order to obtain a limited quantity of valuable fuel. Many processes have been tried and abandoned, as they proved to be too expensive. A few plants in Germany and Holland are working on similar lines with brown coal, but a large portion of the water is expelled mechanically before drying by heat. Much labor and money have been expended in Germany on the development of the peat industry, and nearly all modern methods have originated in that country. Great efforts are being made to establish the manufacture of solid peat briquettes as a permanent commercial industry. In Holland there are many acres of peat bog excavation under cultivation, and supporting from 300 to 350 people per square mile. In some water-filled bog

trenches, fisheries are established on a large scale.—*Journal of the Society of Arts.*

#### THE ACTION OF LIGHTNING STROKES ON BUILDINGS.<sup>1</sup>

**I**N a paper entitled "The Protection of Buildings from Lightning," which was read at the Glasgow meeting of the Association in 1901, the author mentioned the establishment of the Lightning Research Committee, organized jointly by the Royal Institute of British Architects and the Surveyors' Institution, who have since investigated a very large number of occurrences from the reports furnished by their observers. It was decided after the first year to confine the committee's investigations to buildings which were fitted with conductors, and, following this course, the reports on about forty protected buildings affected by lightning have been summarized by a sub-committee, and are having the attention of the General Committee, who will in due course issue a report.

The principal causes of the failure of the usual style of lightning rod as fitted on the buildings investigated appear to be due to the following: (1) Insufficient number of conductor and earth connections; (2) the absence of any system of connecting the metallic portions of the buildings to the lightning conductor, especially the interconnection of the finials, rain-water pipes and gutters. In the author's opinion the frequent damage by side-flash from the conductors might be lessened by running a horizontal conductor along the ridge, or along the parapets of all the roofs, somewhat after the method which is almost universally adopted in Central Europe.

The lightning strokes may be divided into three classes: (1) Those where the conductor conveyed a portion of the flash to earth, but the side-flash to other unearthed metallic conductors damaged the building; the practice of running the conductor round the projecting masonry, often taking sharp bends, doubtless facilitated the deviation of the current from its direct path to the earth. (2) In several observations a metallic roof of large area received the flash, consequently became highly charged, and the single conductor failed to convey the whole of the stroke, a portion of which took a circuitous path—for instance, through a speaking-tube and an electric-bell wire. (3) A flash struck the building at two points simultaneously, a lightning conductor taking one part of the stroke, but damage was caused by the other portion selecting an unprotected part of the roof.

*Earth Connections.*—With a few exceptions these had the defect common to nearly all earth-plates which are simply buried in the ground close to the foundations of a building, and owing to drainage soon became dry, consequently are of very high resistance. Architects, as a rule, object to sufficiently deep holes being made near a structure; consequently the permanently moist ground is not reached. The tubular earth designed by the author does away with this objection, and can be kept moist by leading a small tube to the nearest rain-water pipe.

*Interconnection with the Metal Work of a Building.*—Although the utility of the external metal was specially put forward in the report of the Lightning Rod Conference in 1882, their recommendation has been apparently disregarded in all the cases under review. The Cavendish Laboratory (No. 64) stroke, which was fortunately unattended with danger owing to the gas in the gas-pipe which formed the path of the current being turned off, would not have taken this circuitous path had the leaden roof been connected to the conductors, which ran down the tower only, also to the rain-water gutters and pipes, which should have been interconnected at the bottom and properly earthed. Again, at Bedford (No. 88) last year, St. Paul's Church was seriously damaged by the flash leaving the single conductor on the tower by the water on the roof and passing thence to earth by means of the rain-water pipes. In this case it is interesting to note that the lead pipes were not fused, but their round section was changed into an oval one; the iron water-pipes were broken. This incident and No. 68 (St. Pancras Church, Euston,) show clearly that the damage was due not to direct stroke, but by a portion of the flash leaving the main conductor and taking a circuitous path round the unconnected metal work outside and inside the buildings.

*Observation No. 2: Kea Church, Truro.*—The copper sheathing

<sup>1</sup> A paper, written for the British Association meeting at Cambridge, by Mr. Killingworth Hedges, M. Inst. C. E., Hon. Secretary Lightning Research Committee, Royal Institute of British Architects.

of the spire, owing to its great capacity, could not discharge through the one excellent conductor to earth, consequently the flash divided, part going by the conductor and part by the alternative path formed by the copper covering of the spire to a rain-water pipe, thence sparking through a parapet wall to lead, flashing down another pipe, and then along a very small copper wire used for training plants, to the main conductor. Similar effects were noted in Stoers Lighthouse (No. 54) and Devaar Lighthouse (No. 56), the divided flash in the former leaving the conductor for a telephone wire and in the latter for a speaking-tube. In these observations the conductors may be said to have acted to a certain extent, and if the structures had been entirely unprotected the damage would have been greater, but by proper attention to the necessities of each case, and increasing the number of the conductors, the risk would probably be nil, as there would be a definite path for the lightning to take.

Quite the most interesting case is that at Possingworth House (No. 67), struck in June and again in August, 1902, although the roof fairly bristled with air terminals, every chimney being protected, mostly with its own conductor and earth connection. It is probable that on the second occasion the flash divided, one part selecting a chimney stack, which it damaged, bending the air terminal to an angle of 45 degrees, while the other, neglecting the many points, fell on an unprotected statue much lower than the chimney and went to earth by the iron frame of a conservatory, showing the unreliability of a number of independent conductors which should have been interconnected by means of a horizontal wire led along the ridge; this would in all probability prevent any serious damage.

Sir Oliver Lodge has shown by an interesting experiment that a column of hot air is often selected by a flash although a lightning rod may be affixed to the side of the chimney. Most of our large stacks have a band of metal to which the air terminals are fitted, and from these two conductors should be led to earth. The method adopted in Germany appears to be simpler, and consists of a heavy iron frame rising to a sufficient height above the stack, and continued at the apex so as to form an aigrette. That lightning may prefer the smoke issuing from a chimney was shown by the stroke at the East London Water Works, Sunbury, last year, the flash doing some damage to the capping before it arrived at the standpipe inside, which was a perfect earth in that it was in direct connection with the company's mains.

The general conclusions arrived at by the author are that there is very little advantage in placing isolated rods on an ordinary building unless it has a high tower. A church, for instance, with a spire should have at least two conductors from top to earth. Even then, if any other part of the structure happens to be in the path of a discharge from a cloud to the ground, the stroke may disregard the protected towers or spire and fall on the building, choosing some lower point. If the suggestion put forward by Sir Oliver Lodge at the Bath meeting in 1888 were more closely followed, and the conductors so arranged that they form a protective network over all the roofs, a flash would in all probability be received by some portion of the system and pass without harm to the ground by one of the numerous earths to which the network would be connected.

The insurance offices appear to disregard the question of adequate protection, and are quite content if the single conductor which has not prevented serious damage, for instance, to a church is replaced, and, moreover, take no steps to have the earth connection tested periodically; also the few unconnected lightning rods erected on our national museums, picture-galleries, and other public buildings contrast most unfavorably with the more scientific methods adopted on the Continent, more especially in Germany, where in some districts the local authorities have issued rules as to the erection and testing of lightning conductors, to which the various public bodies have to conform, and in some cities householders are subject to penalties if the system is allowed to get out of order.



[Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.]

HOUSE OF PROF. MAX LITTMANN, ARCHITECT, MUNICH-BOGENHAUSEN, BAVARIA.

THIS plate is copied from *Deutsche Bauzeitung*.

"SCIENCE": MODEL FOR A GROUP FOR THE PALACE OF MANUFACTURES, LOUISIANA PURCHASE EXPOSITION, ST. LOUIS, MO. MR. GEORGE E. BISSELL, SCULPTOR.

CITY HAY-SCALES, MUNICH, BAVARIA. HERR HARTWIG EGGERS, ARCHITECT.

THIS and the following plates are copied from *Architektonische Rundschau*.

CHURCH AT NABBURG, BAVARIA;—TOWN-WALL TOWER, QUEDLINBURG, SAXONY.

TOWER ON USEDOM ISLAND, PRUSSIA;—THE CASTLE TOWER, ROCHSBURG, SAXONY.

OLD HOUSES, LUNEBURG, HANOVER.

THIS plate is copied from *Blätter für Architektur*.

#### Additional Illustrations in the International Edition.

OFFICIAL RESIDENCE OF THE PRESIDENT OF THE PARLIAMENT AND THE HOUSES OF PARLIAMENT, BERLIN, PRUSSIA. HERR PAUL WALLOT, ARCHITECT.

THIS plate is copied from *Blätter für Architektur*.

TRINITY COLLEGE CHAPEL, CAMBRIDGE, ENGLAND.

ELY CATHEDRAL, FROM THE SOUTHWEST.

THE WEST FRONT: CARLISLE CATHEDRAL.



DEEP ENGLISH MINES.—With increased and increasing demand for coal came the necessity for opening our lower seams, and deeper shafts meant heavier capital expenditures in colliery enterprise. It is worthy of remark how little the outside public realize of the great difficulties that often have to be overcome in sinking—such as passing through water-bearing strata or running sands—or of the enormous cost entailed by some colliery developments. As early as 1829 John Buddle, in giving evidence before the House of Lords, declared that the cost of sinking, even then, was frequently £10,000 to £15,000, and J. T. Taylor stated before a select committee on rating of mines in 1857 at Haswell colliery, in the County of Durham, £40,000 was expended in contending with a quicksand, and that the shaft had ultimately to be abandoned. At Murton colliery, a few miles distant from Haswell, £300,000 was expended in sinking; the quantity of water pumped during the operation of passing through the overlying magnesian limestone bed amounted to an average of 9,306 gallons a minute from a depth of 540 feet; and the three shafts ultimately reached the Hulton seam, at a depth of 1,488 feet from the surface, in April, 1843. Many deep and costly sinkings—several much deeper than in the last instance—have been put down since the Murton winning, but, none, I believe, at a greater expenditure of capital, owing, doubtless, to the greatly improved methods now employed in carrying on such operations through watery strata—notably the Kind-Chaudron system, whereby the shaft is bored out and the side protected by metal cylinders lowered from the surface; and the Poetsch or Goberat methods, whereby the water is frozen in the "running" sand or the other water-bearing stratum, and the shaft sunk through the solid mass.—*Engineering Magazine*.

ALMA-TADEMA PICTURES BY THE DOZEN.—Now that Alma-Tadema's pictures fetch almost any price—one we remember to have fetched £6,000—it is interesting to recall that once upon a time they were ordered by the dozen—"like gloves," Lady Alma-Tadema is reported to have said. This was when Mr. Gambart, the great picture-dealer, was at the height of his career, and, coming to London, found himself at the door of a wrong studio—at any rate, not the studio he intended to reach—and was asked by its owner, young Alma-Tadema, to enter. "Did you paint that picture?" asked Gambart, pointing to the canvas on the easel. The painter admitted the offence. "Well, then," said Gambart, "let me have twenty-four of the sort at progressive prices for each half dozen." The delightful bargain was struck; and proved to be mutually so satisfactory that, on its completion, four years later, another twenty-four pictures were ordered, and in due time executed. A silver jug, bearing a flattering inscription, and given by the dealer to the artist to commemorate the completion of the contract, is among the most romantic of the many souvenirs in the Alma-Tadema treasure-house in St. John's-wood.—*London Chronicle*.

**MOSAIC RELICS IN ABYSSINIA.**—When a monarch is aware that his claims to illustrious ancestry are treated with incredulity and a foreigner appears upon the scene and places in his hands a document proving the truth of his assertions, he is naturally disposed to feel most kindly toward the individual in question and to overwhelm him with favors. This is precisely what Hugues le Roux, an exceedingly clever Frenchman, half journalist, half diplomat, has managed to accomplish in Abyssinia. The ruler of that country has always insisted, like his predecessors on the throne, that he is descended in a direct line from the Jewish King Solomon and from the Ethiopian Queen of Sheba, the founder of the reigning house of Abyssinia, Menelik by name, having been born to the Queen shortly after her return from her memorable visit to King Solomon at Jerusalem. Le Roux, after obtaining permission from the Negus to visit the islands of the sacred lake of Zonai, in the interior, discovered there in a semi-ruined monastery papyri dating back to the days of King Solomon and the Queen of Sheba which establish the truth of the relations of the Ethiopian Queen and King Solomon, and ascribe to him the paternity of Menelik, the son to whom she gave birth on her return home, and who founded the present line of rulers of Abyssinia. So delighted was the present Emperor Menelik with this discovery that he not only conferred upon Le Roux the Grand Cross of his Order of Solomon, of which King Edward is the only other Grand Cordon, but likewise gave him permission to continue the railroad line from its present terminus of Diridana to Addis Abeba, the capital of the empire, only stipulating that Le Roux shall obtain the approval of the English government to the scheme. For, although the railroad, which runs from the French seaport on the Red Sea coast, Djibuti, was built entirely with French capital, it has now passed to a great extent into the hands of English investors. Both France and England have been endeavoring for years, without success, to get Menelik to allow the railroad to be continued from Diridana to the capital, and Le Roux's victory has given as much satisfaction to France as to England, since it will virtually have the effect of opening up the Ethiopian empire to the trade of both countries. Of still greater interest from a scientific and archaeological point of view is the permission which Le Roux has obtained from the Negus to institute a thorough exploration of the islands of the sacred lake of Zonai. These islands, which, until the day when visited by Le Roux, had never been seen, save in the distance, by any white man, are dotted with ancient monasteries, most of them in ruins, and only a few of them inhabited by ignorant monks, who have no knowledge or power to comprehend the importance of the treasures within the walls of their abode. For it is known that at the time of the great Mahometan invasion, about four hundred years ago, all the sacred relics and the treasures of the nation, all the historical records, and, in fact, everything of value, was bundled off to the monasteries of the island of Zonai and concealed there in order to protect them from being carried off or destroyed by the Moslems. It is a matter of tradition in Abyssinia and of belief in the scientific world of Europe that the original Jewish Ark of the Covenant, containing the Mosaic stone tables of law, the seven-branched candlestick and all the other treasures of the Temple of Solomon, which disappeared from Jerusalem at the time of the so-called Jewish captivity, were dispatched by the Jewish high priests for safety to Abyssinia, where the Queen of Sheba had, after her return from Jerusalem, established the Jewish faith, which subsisted until Christianity was introduced into the country a few centuries after the birth of Christ. It is generally believed that the Ark of the Covenant, along with all the other relics contained in the Holy of Holies of the Temple of Solomon, will be found in some of these monastery islands of Lake Zonai. Whether these suppositions are well founded or not, there is no doubt that thorough and systematic exploration of the sacred islands of Lake Zonai will result in finds of extraordinary value and interest from scientific, archaeological and historical points of view, since, owing to the jealous care with which foreigners have been kept away from the islands, they are from the point of view of the explorer to all intents and purposes virgin soil.—*Marquise de Fontenoy in N. Y. Tribune.*

**THE "HOT-AIR COMPANY" OF BALTIMORE.**—"One of the new enterprises that will be carried out in Baltimore's burnt district," said a lawyer from that city last night, "is the establishment of a heating and refrigerating plant for the supply of these two commodities throughout the section. I believe that 90 per cent of the new buildings along its pipe line will take their heat from this concern instead of producing it through individual boilers. This is popularly known as 'The Hot-air Company.' It proposes to put in metres which will register the amount of condensation, so that the consumer will pay with considerable exactness for the amount of steam that he uses, and will thus be under the same motives to be reasonable and economical as if he were furnishing the coal himself. The incidental advantages of such a system are very great. The danger from fire will be much lessened, and the insurance companies will doubtless give lower rates on the buildings which are so equipped. The city will invite bids from this company for heating the City-hall and Court-house, and these will be compared with the approximate cost under the old system.

One considerable economy is in the cartage of coal. For this central plant it could all be unloaded direct from the cars or canal-boats. It often costs more to carry a ton of coal a very short distance behind a horse than several hundred miles behind a locomotive, and the transportation of the fuel is one of the large items in the price of heat. Professor Woodbridge, I understand, is already making a study of the Washington public buildings with a view to a similar undertaking. I look to see considerable development of this idea."—*N. Y. Evening Post.*

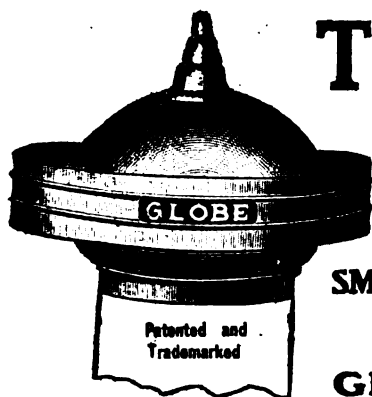
**WAGES AND HOURS OF LABOR IN BUILDING TRADES.**—In the July report of the United States Bureau of Labor, of the Department of Commerce and Labor, an elaborate statement is presented of the wages and hours of labor in the principal industries of the country. We give below an extract from the report, showing the comparative wages and hours of labor in the building trades for the years 1903 and 1890, together with the percentage of increase or decrease in 1903 as compared with 1890. This comparison will be of especial interest at the present time, when the subject of labor in the building trades is so much to the front. In the subjoined list the wages column represents cents per hour, and the hour column hours per week:—

	Wages			Hours		
	1903.	1890.	Per ct.	1903.	1890.	Per ct.
Bricklayers .....	55	43	27	48	53	10
Carpenters .....	36	27	33	49	56	12
Cornice-makers .....	41	29	41	48	55	12
Gas-fitters .....	42	30	37	49	56	12
Hod-carriers .....	29	23	27	48	53	9
Inside wiremen.....	41	26	57	49	56	13
Laborers .....	17	15	11	56	59	5
Lathers .....	38	32	18	46	55	17
Painters .....	35	27	29	49	55	12
Paper-hangers .....	36	28	28	50	56	11
Plasterers .....	53	37	44	47	54	12
Plumbers .....	44	35	26	49	54	10
Roofers, gravel and tar .....	26	22	17	57	58	2
Roofers, slate and tile .....	42	33	27	49	54	10
Roofers, tin.....	35	27	26	50	56	10
Steam-fitters .....	43	32	33	48	55	13
Stone-masons .....	45	37	21	50	55	9
Stone-setters .....	50	40	26	49	54	9
Structural iron workers .....	41	25	66	51	57	10

**STREET-CAR AND MOTOR DUST.**—With reference to remarks on the increase of street dust, in various towns, in articles in the papers, I fully concur in ascribing it to the action of the new cars and motors on the roads. These roads were not originally constructed for carrying mechanical vehicles, but only horse-drawn carriages, so that they will have, in due course, to be remodelled, and laid anew to meet the change in mode of conveyance. The wheels of cars and motors fulfil a double, and different function from those of a cart or carriage, as they have to bite the road hard, or dig into it for a *point d'appui*, as well as to support the machine. In a horse-cart or horse-carriage, the grip of the road is obtained by the four feet of the animal, and the wheel is left free to support the machine only, and so they have to roll smoothly over, and not grip the road as the motor-cars do. All four wheels of a motor are doing their weightiest to grip the road all round their tires, but the horse only grips it with two feet at a time, and this surface of contact is of only a small extent, and is as widely separated as the step. The motor wheel acts therefore as a grindstone, or marble cutter, and is driven by power machinery against the road, which it must eventually consume away, and disperse in gravel and dust. The wheels of a horse-carriage on the contrary act as conservative agents on roads, on the principle of the cricket or garden roller, when they are passive agents of the gardener, or ground-keeper, pushing or drawing them. The nuisance of the motor dust will therefore tend to increase, as those vehicles become more used, and the only remedy that would seem to apply to them is to make the roads of asphalt or concrete, so as to be impenetrable, or unimpressionable to the scraping action of the car.—*Wm. J. Black, F. R. C. S. E., in the Journal of the Society of Arts.*

**THE ART DESTRUCTIVE AND THE ART PRESERVATIVE.**—A trial was recently made in Austria to decide in how short a space of time living trees could be converted into newspapers. At Elsenenthal, at 7:35 in the morning, three trees were sawn down; at 9:30 the wood, having been stripped of bark, cut up, and converted into pulp, became paper, and passed from the factory to the press, whence the first printed and folded copy was issued at 10 o'clock. So that in 145 minutes the trees had become newspapers.—*Exchange.*





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NO. 1500

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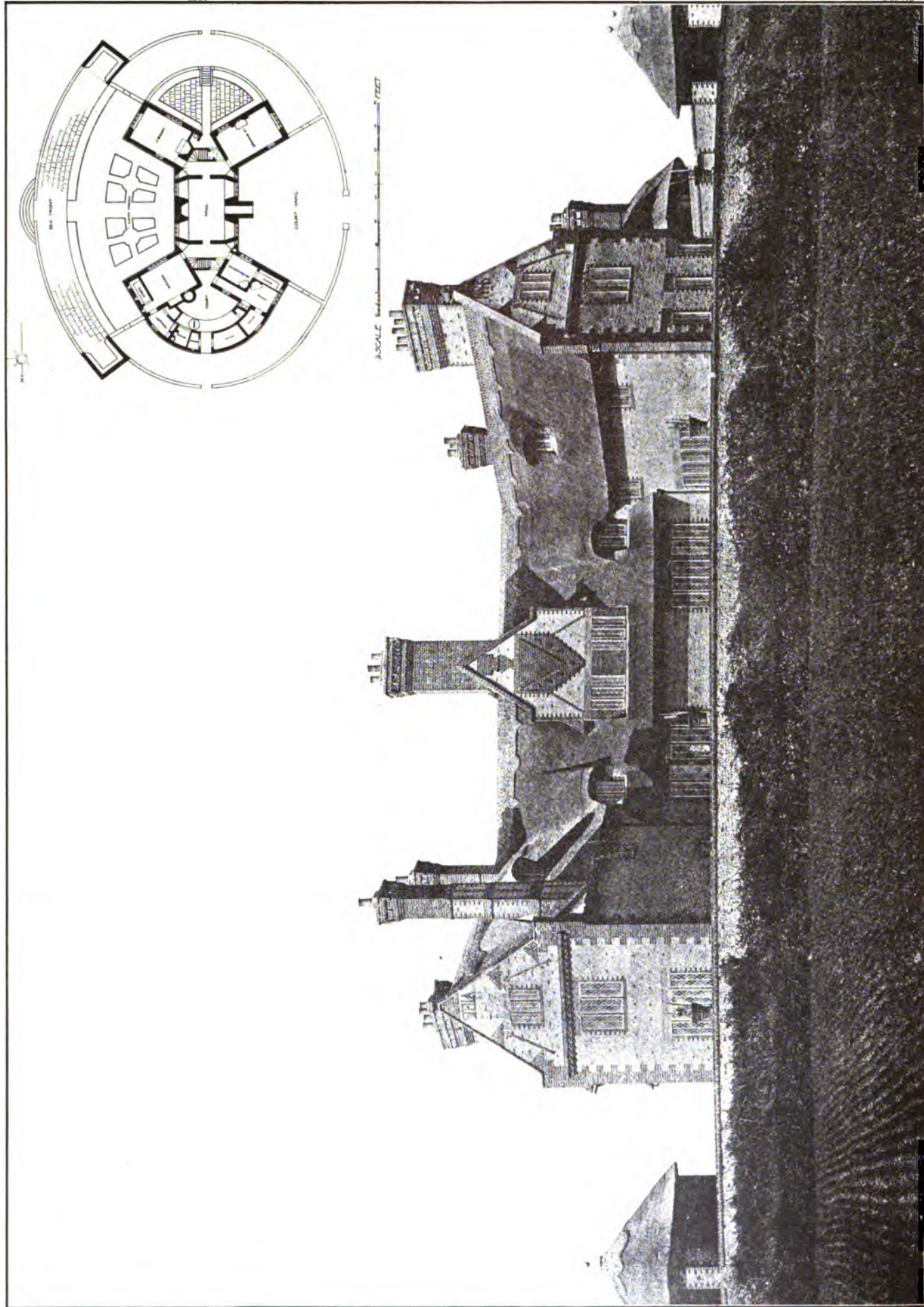
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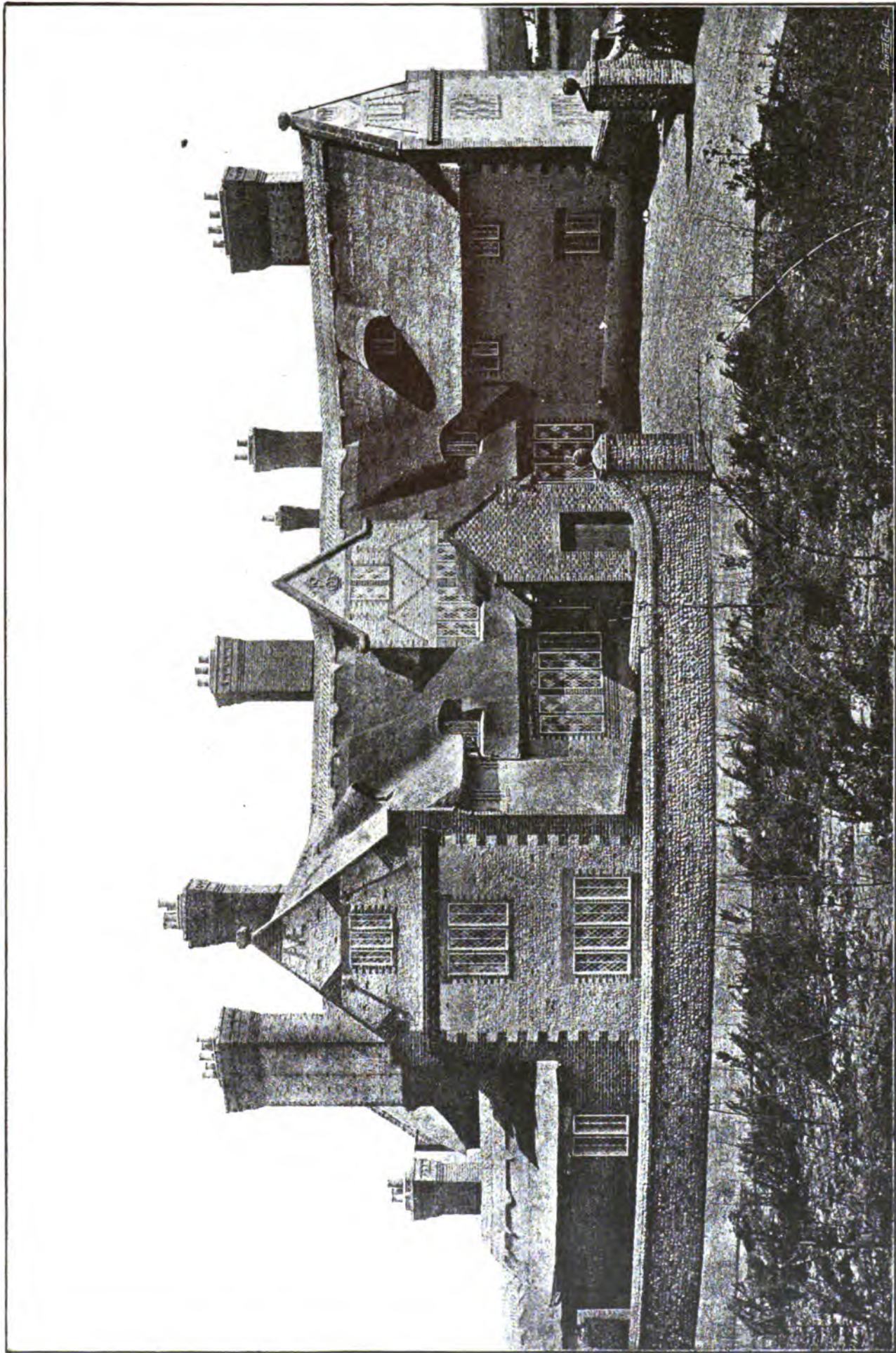


HOUSE AT HAPPISBURGH, NORFOLK. [GARDEN FRONT FACING SEA.]  
 DETMAR BLOW, ARCHITECT.

FROM THE ARCHITECTURAL REVIEW.

The American Architect  
 Sept. 24, 1904.  
 No. 1500.





HOUSE AT HAPPISBURGH, NORFOLK. [ENTRANCE FRONT.]  
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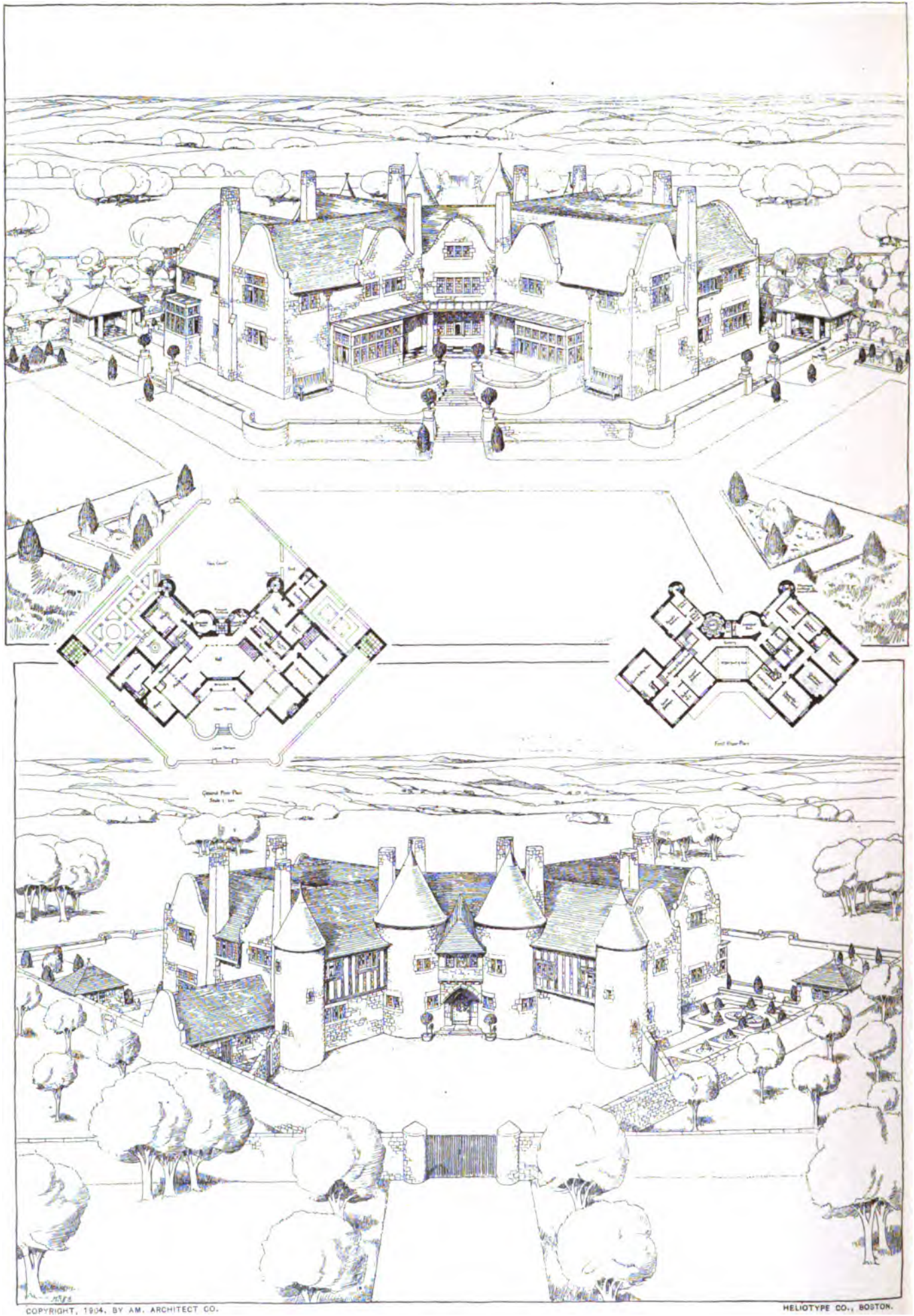
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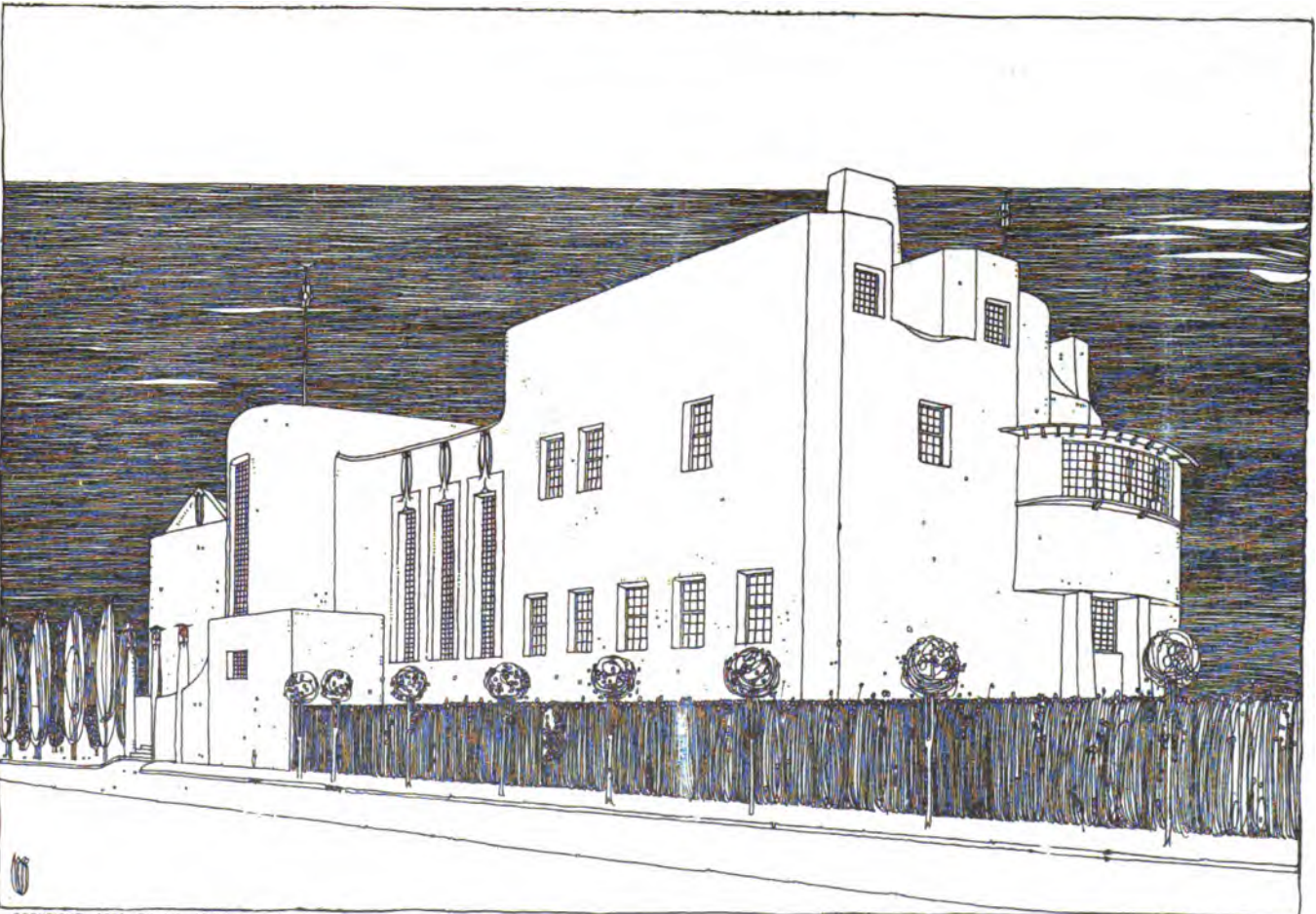
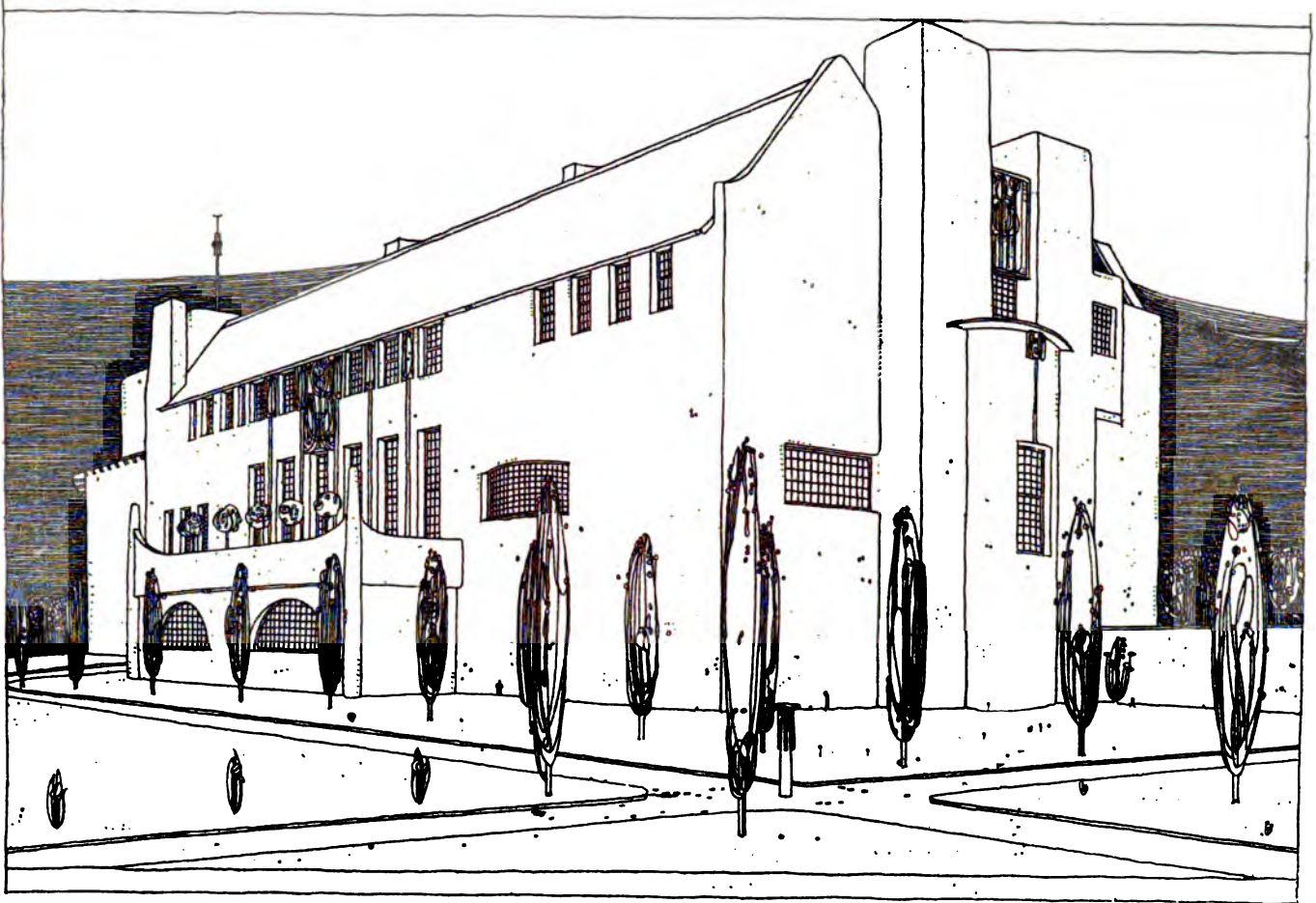


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*Old House, Dijon, France.*

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*The Clock-tower: Notre Dame, Dijon, France.*





# THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. LXXXV

SATURDAY, SEPTEMBER 24, 1904

No. 1500



## SUMMARY:—

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THE last report of the Massachusetts Bureau of Statistics of Labor contains some interesting information on the matter of the amount of time that is lost by workmen, which, as things are, means an inevitable loss of income. The report presents the situation as a matter of averages only, and deductions are of value only when this fact is kept in view. It appears, then, that the average time lost by those who depend on weekly wages amounts to very nearly twenty-two per cent, of which loss a little more than half, or to be exact eleven and one-half per cent, is due to being absolutely "out of work." These figures make it all the more astounding that workmen who must average a loss of nearly twenty-two per cent of possible income should voluntarily lose still more through unreasonable and costly strikes. It is interesting to note that the average loss of time because of sickness amounts to only two and a half per cent, but it does not appear whether all the sickness is real or whether the Monday headache is included in the returns. Bad weather, which mainly affects building mechanics and common laborers, is responsible for the loss of over five per cent of time and wages. Bad weather and sickness, of course, affect the interests of the employer as well as those of the workmen, and when one considers the possible total effectiveness of labor the standard loss to the employers is enormous. Not only must deductions be made for sickness and bad weather, but for the growing willingness of union men to grasp every pretext for not working,—the idling in beginning the day's work and the leisurely preparations that are made to stop work so that union rules may not be overstepped by a moment. It is doubtful whether human labor was ever less productive—compared with its possibilities—than it is now, and it is small wonder that employers resort to machines as often as practicable.

SOME time since we chronicled the fact that a certain banking-house in New York had held up an important building enterprise for some time, because of having a lease of offices in the old building, until the promoters of the new building would consent to provide them with satisfactory offices elsewhere. The building enterprise in question has lately met with another unfavorable experience, since the promoters have been sued by the owner of the adjoining estate for trespass, on the ground that they have built their structure partly on his land, and land in the neighborhood of Wall Street is too valuable to be lost without a fight for its recovery. Were it not for this, the fact that the trespass amounts to only about eight-one-hundredths of a foot for a length of some seventy-five feet would seem to make the affair too trivial to take any account of. As the International Banking Building has built the outer film of its twenty-seven stories on land that does not belong to it, it would be a terribly costly operation to set right the wrong it has unintentionally committed, and its cheapest way is to buy the land, even at a fancy price. The incident calls attention to the necessity not only of having the building set out by competent engineers, but of having the engineers take their sights from time to time, so as to make sure that their lines are being observed by the contractors as the work proceeds. As for the other owner, discovery of the mistake at this time may have saved him from serious loss later when he came to build, for, imagining that he had the full use of the land as shown by the survey of the front of the lot, he might later have found himself called on to meet the expense of costly field corrections when he came to fit his steel work into the stretch where he had lost eight-one-hundredths of a foot.

IT is reported that the owners of the new Trinity Building, New York, that is to flank one side of Trinity Churchyard, having decided to forbid their tenants on that side of the building the use of signs on the glass of their windows, the object being to show an outward respect for its ecclesiastical neighborhood. This action, if it is to be taken, may be excellent in intention though rather fanciful in theory, and seems likely to be rescinded after trial, as it would probably lower the rental value of offices on that side of the building. It would be distasteful to see the windows bearing flamboyant signs of quack medicines—but they are disagreeable wherever one finds them—but short of that we can see no offensiveness in the usual broker's, banker's or lawyer's name in such a position. Trinity Churchyard lost long ago, with the advent of the elevated railroad at the rear and the commercial bustle on Broadway in front, all the right of quiet privacy which usually belongs to God's half-acre and which some graveyards, the Granary Burying-ground in Boston, for instance, have managed to preserve in spite of the encroachment of commercial activities, and we do not feel that a few gilt window signs will cause it to lose what of sentimental regard the community still feels for it.

THE American world of art was unquestionably startled last week, when it saw a half-column of space of the first page of the usually well-informed New York *Tribune* given up to an account of how "Michael Angelo's secret of Mural Decoration" had been rediscovered by a certain German artist, who was making use of his discovery in decorating the Roman Catholic Church of Our Lady of Lourdes, in Brooklyn. The reporter, who plays the part of advance agent to the discoverer, seems to sum up the situation when he "admits" that it is "essential to success to apply the paint while the plaster is wet," a fact that has hardly remained concealed until to-day. If Michael Angelo had any secret, it certainly was not that fresco painting must be done while the plastering is fresh and damp, and we question whether the fading of certain frescos, Lionardo's "Last Supper," for instance, while the paintings in the Sistine Chapel are still brilliant, means anything more than that in the first instances the artists ignorantly used vegetable colors or colors which set up a reaction with the salts of lime, and that the better-instructed author of the Sistine decorations used only mineral colors which were unaffected by lime. Even if the rediscovery is a real one, we question whether it will lead to a revival of true fresco painting, for the reason that the modern method of painting on canvas is much more convenient for the artist, is more expeditious, and consequently cheaper for the client. It seems likely that, if fresco painting had been a really desirable and perfected form of decoration, it never would have been allowed to become a lost art; and hence that any attempt to revive it nowadays is likely to be the work of mere fashion-mongers, who realize that, in many cases, more money will be paid for a mediocre result because it is novel than for a really good result obtained by accustomed means.

IT has always been a mooted question who designed the Paris Hôtel de Ville, and though it is commonly ascribed to "Il Boccador," as Dominic of Cortona was called, it is always with a hint of uncertainty. That this should be the case to-day is rather strange, seeing that only a few years ago there was found in the Bibliothèque Nationale the record of a species of contract order or vote of appropriation providing for money to pay him while producing a model for the building. Lately the discussion has been revived apropos of the contemplated action of the Comité des Inscriptions Parisiennes, who favor the claim of Il Boccador at the expense of Pierre de Chambiges, the other possible author of the design. But M. Marius Vachon, who has studied both buildings *au fond*, is convinced that Chambiges not only designed the old Château de Chantilly but the Paris Hôtel de Ville as well, and his arguments have been so convincing that the Société Centrale des Architectes Français has recommended that the Comité des Inscriptions Parisiennes shall place in the Hôtel de Ville the following inscription:

L'HOTEL DE VILLE.  
COMMENCE VERS 1533 D'APRES LE MODELE DE DOMINIQUE DE CORTONE  
DIT LE BOCCADOR REEDIFIE VERS 1535,  
SUR LES PLANS DE PIERRE IER CHAMBIGES,  
MAISTRE D'OEUVRES DE MACONNERIE DE LA VILLE DE PARIS,  
CONTINUE ET ACHÈVE EN 1628.  
PAR GUILLAUME, PIERRE ET AUGUSTIN GUILLAÏN,  
MAISTRES DES OEUVRES DE MACONNERIE DE LA VILLE DE PARIS.

AGRANDI PAR GODDE ET LESUEUR,  
ARCHITECTES, DE 1837 A 1846,  
INCENDIE EN MAI, 1871.

A ETE RECONSTRUIT PAR TH. BALLU, ARCHITECTE EN CHEF  
ET DE PERTHES, ARCHITECTE,  
DE 1874 A 1882.

THE Académie des Beaux Arts has just decided to do a very unusual as well as very gracious thing in voting that, for once at least, the long-continued strivings of a very deserving contestant for the Prix de Rome should not be altogether fruitless. Perhaps the failure to win the Prix de Rome is no more blighting to a man's future than catastrophes of similar nature that befall under less picturesque conditions, but there are few competitions that call for a steadfast preparation of twelve or fifteen years' duration, and to fail at the last moment—the passing of the age limit barring another attempt—must be very bitter, as, for the moment, it must make the long years of effort seem sheer waste of time. This fact is well recognized by the jury, and more than once the prize has gone to the less deserving of two competitors simply because the elder had reached his last chance, while the younger seemed sure to win next year, and usually does. This year, because the Prix de Rome in painting could not be awarded, the Académie has voted to give the money to M. Prévost, pupil in architecture of MM. Guadet and Paulin, as compensation for his losing the Prix de Rome on a technicality, and so enable him to appear at the Villa Medici and elsewhere as a travelling scholar of the Académie. As M. Prévost won the Deuxième Grand Prix a year or two ago, which made his future fairly well assured, this unusual tribute to real worth will put him in almost as good a position as the actual winner of the prize.

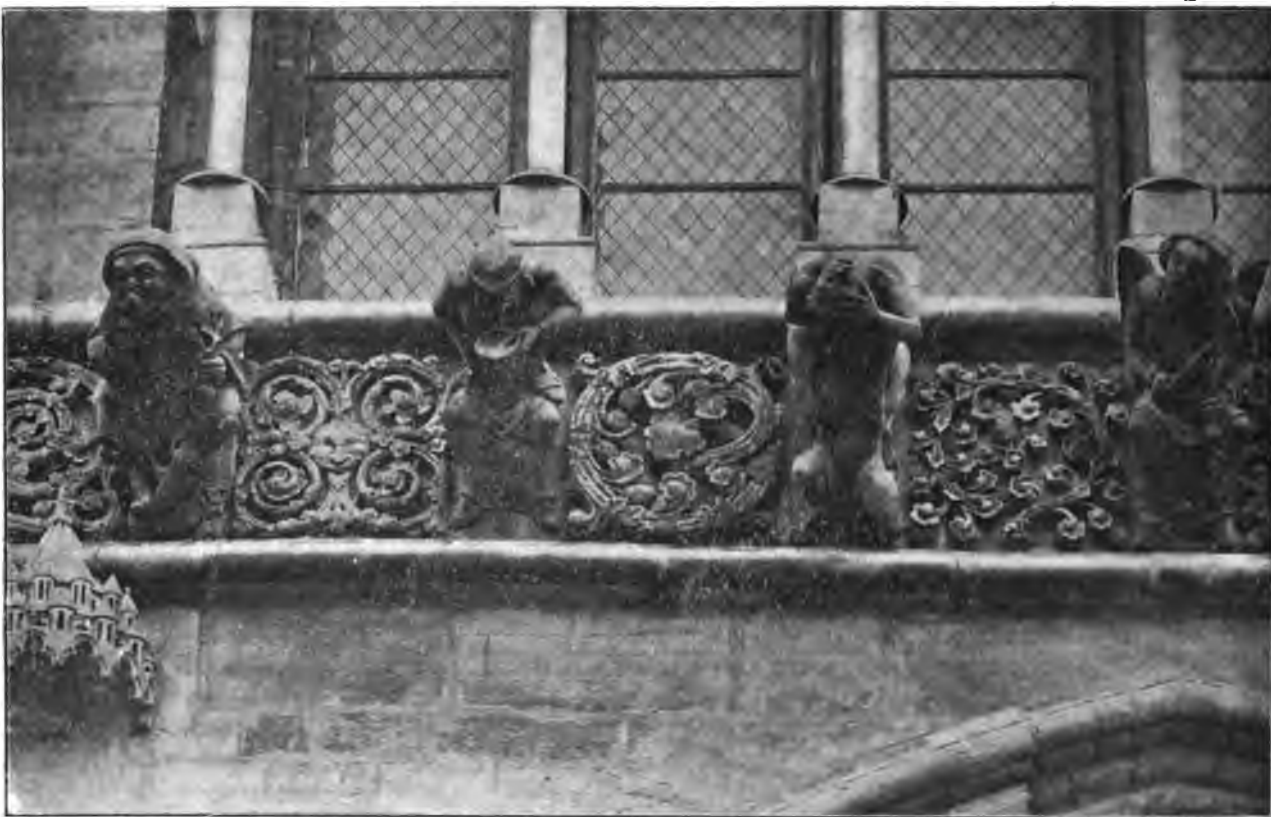
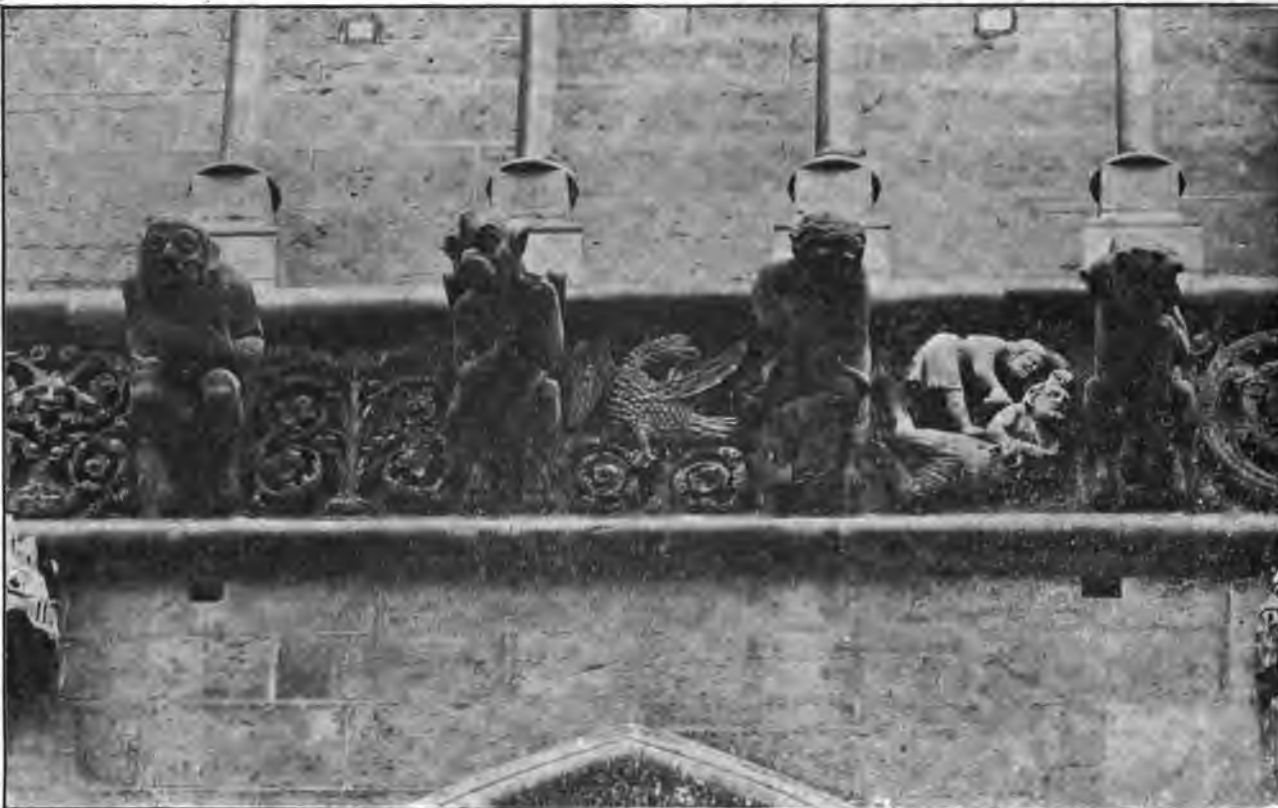
THE vacuous immensity of the Place du Carrousel was once rather impressed on the writer in his student days, when, turning into it through the westernmost passage from the Rue de Rivoli after midnight, he saw that the couple, whose peculiar actions had already attracted his attention, instead of striking straight across to the *guichet* on the other side of the Place, had turned up toward the arch and halted, the woman evidently unwilling to go farther. Halting to see what would happen next, the onlooker was startled at seeing the man pick his companion up bodily, with evident intention of dashing her down upon the pavement, but stopping as soon as he heard footsteps coming towards him. As the woman made no appeal for help, there was no excuse for interfering in what was evidently a bit of domestic drama. But the incident impressed on the memory not only the vacancy and unguardedness of the great space but its state of neglectedness. At last this condition, that has existed since the Commune, is to be changed and the garden of the Tuileries is to be prolonged into the Place between the existing wings of the former palace as far as the Pavillon de Rohan, where it is to be terminated with balustrading. In this way the Arc de Triomphe will once more become a real centre of interest instead of a detached feature standing off at one end of a meaningless desert of pavement, and the stony waste will no longer be the scene of possible midnight adventures, as we believe stragglers are still kept out of the public gardens of Paris after nightfall.

DIJON.

**T**HE capital of the Duchy of Burgundy is an interesting old town in spite of modern improvements. Most people going south rattle by in the dark, but there is this excuse for them—whether going or returning, the weather is more or less cold,

There are many fifteenth century buildings, and notably some timber houses, finely carved.

The Palace of the Dukes was begun in 1366, but it is completely modernized in the front elevation. The hall, with its fine sixteenth century chimney, is a grand specimen of domestic architecture of the period. The ancient kitchen and a large



GARGOYLES, NOTRE DAME, DIJON.

and Dijon, being over 800 feet above sea-level, is anything but a warm place for sojourning, wherever one comes from.

mediæval tower still exist. The Palace is now a museum, one of the richest of Provincial France. Some of the contents, indeed

most of them, are worthy of detailed study. But the principal objects of interest are the monuments of Philippe le Hardi and his son, Jean-sans-Peur. The former is somewhat earlier, and of a severer type; the latter is what we should term of the Decorated period. They are magnificent specimens of sculpture. The figures of the Dukes are finely modelled, as also are the gilt metal angels, with their huge wings; and the

they were restored and placed in the museum. The Chartreuse was founded by Philippe le Hardi and chosen by him as a burial place, but on the suppression of the monastery, the tombs were placed in St. Bénigne, where they rested until the Revolution. The older tomb is the work of Claus Slater, a Dutch sculptor.

There are several altar-pieces in carved woodwork, and a remarkable metal retable with folding doors and wooden



LE Puits de MOÏSE IN THE CHARTREUSE, DIJON.

"weepers," or mourners, a series of statuettes under canopies, display a variety of strange monkish figures. This style of tomb seems to have been affected in Burgundy, as another (now in the Louvre), that of Philippe Pot, is also a fine specimen of quaint workmanship in sculptured weepers. The latter is colored. The Ducal monuments were originally in the church of the Chartreuse monastery, near Dijon; but during the Revolution they were carried away piecemeal and hidden to prevent their destruction. In 1818

statuettes of saints, the work of Jacques de Baerze, 1391. This was also in the Chartreuse monastery.

The Church of Notre Dame was built from 1220-1230. The open arcades above the porch of the west front (which extends the whole width of the building, are exceedingly beautiful; the gargoyles are very quaint, somewhat resembling those of the Paris cathedral and other mediæval churches, but more gross. The figures represent gluttony and its consequences, angels and



demons playing instruments, and other coarse conceits. But the ornament in between the figures is rich and beautiful.

The clock brought in 1382 by Philippe le Hardi from Courtrae still stands at the south side of the façade. It was made by a Fleming, Jacques Marques, and was considered by Froissart to be one of the most curious in or outside Christendom. The figures which hammer the bell still go by the name of Jacquemars—a man with a pipe in his mouth, a woman, and two naked children. It is curious that these figures, which are frequently found as the hammerers of old bells, have retained the name of Jacquemars, though of course in the church of Dijon it is only a corruption of the name of the maker. At Wimborne, Dorset, the figure of a soldier in eighteenth century costume performs the office of hammerer to the strike bell of the clock upon the western tower, and is known by the name of "Jackman," or "Quarter Jack"—striker of the quarters. At Wells Cathedral, Somerset, there are also quarter Jacks belonging to the old clock which was made by Peter Lightfoot for Glastonbury Abbey in 1320, and afterwards set up at Wells. Lightfoot was also the maker of the Wimborne clock. Dijon possesses a multitude of desecrated churches turned into hay stores, stables, coach-houses, etc.



THE SOUTH DOOR: S. PHILIBERT, DIJON.

The south door of S. Philibert is a fine specimen of Romanesque architecture. The Chartreuse is now a lunatic asylum. Besides the Dukes above mentioned, Charles the Bold was buried there, but was removed to Bruges by the Emperor Charles V in 1550. A few of its monuments remain: the entrance-gate, a tower, the effigies of Duke Philippe and his Duchess, and the well known as the "Puits de Moïse," the work of Claus Slater (1399). The figures stand on a hexagonal pedestal, originally the base of a column or obelisk. The statues are very fine and full of character, and represent Moses, David, Jeremiah, Zachariah, Daniel and Isaiah, placed under an elaborate canopy, with angels at each corner, and upon brackets ornamented with beautifully carved foliage. It will be seen, by the photograph, how realistic and powerful these figures are; and, in spite of a certain rudeness common to all German and Flemish art, how singularly dignified. There is nothing of the beauty of Greek art, nor of the elegance and spirituality of Italian sculpture, but they are full of character, Burgundian character, and solemnity.

S. BEALE

## MUNICIPAL HOUSING.

IN the section of Economic Science of the British Association, Dr. William Smart, Adam Smith Professor of Political Economy in the University of Glasgow, read an interesting paper recently on this subject. In the course of his address Professor Smart said that for the last two years he had been continuously engaged, as a commissioner, in studying the phenomena of the housing of the poor and the problems arising therefrom, as presented in the evidence laid before the Glasgow Municipal Commission. The problem of housing in Glasgow was, in broad outline, very much the problem of all large centres of population and industry. The city grew up, without a plan, in days when the laws of public health were little understood or cared for; when there was little municipal control and little thought for the municipal future. It had now to undo its mistakes.

When it came to its senses, about forty years ago, and realized what an Augean stable there was to clear out, it turned to the work with a will. Considering the still unformed state of public opinion, the City Improvement Act of 1866 was a very drastic one. It scheduled whole areas of slums and pulled them down, dishousing, within five years, some 19,000 persons; rating for deficits to the amount of some £600,000 altogether; and the burden was borne without much demur. By the time the Act had done its work, the public mind had become thoroughly awake to the danger of letting things alone. Further powers were asked and obtained for closing, demolition and rebuilding. Four years ago was passed the Building Regulations Act, which, in addition to regulating the construction of new houses, made the provision of sufficient air and light space in front of the bedroom windows compulsory, and this was so far retrospective that over 4,000 houses, conforming to sanitary requirements in other respects, became on a certain date "illegal houses" simply from the fact that they had not the sufficient space outside. When, however, it was realized that dishousing on this large scale was accepted by a very large section of the municipality as logically calling for municipal housing on a similarly large scale, public attention was roused. The municipality appointed a mixed commission of nine councillors and six private citizens, with a remit to examine (a) the causes which led to congested and insanitary areas and overcrowding; (b) the remedies which could or should be adopted for the clearance of existing congested, insanitary and overcrowded areas, and for the prevention of these evils in future; and (c) any other phases of or questions connected with the housing problem in Glasgow which the commission might deem it desirable, necessary or expedient to consider and report upon. The evidence, report and recommendations now before the public, generally speaking, bore out the conclusion that many things hitherto discussed as parts of the housing problem were not problems at all, but phenomena which merely needed to be known to secure that they were put an end to. Slums must be cleared away; streets must be widened; overcrowding must be prevented; the liberty of the landlord to sell and of the tenant to use insanitary houses must be interfered with; light and air space must be guarded as a right of the poor. So far as he was able to judge, the real housing problem of to-day narrowed itself down to this: How far did the experience gained point in the direction of the municipality itself building and owning houses for certain of the poorer classes? To this the commission had contributed an answer in so far that, in the special circumstances of Glasgow, it recommended a limited scheme of municipal building and owning. But it added the words "without expressing any opinion upon the general policy of municipal housing."

For a municipality, deliberately and of set intention, to add a new competitive industry to its already manifold activities was a serious matter from three points of view. (1) House-owning was a business, neither a routine business nor one where success was certain. So far as it had not a monopoly, a municipality could not presume upon demand—could not command a remunerative sale for what it provided. As a builder, it had advantages and disadvantages; as an owner it had also advantages and disadvantages—particularly, perhaps, in that it had a conscience. Assuming, however, that a municipality could manage its enterprises as well as private citizens managed theirs, and that its house-owning covered all recognized expenses and ran no risk of coming upon the rates, what must be emphasized was that it pledged the future rate-payers for the security of all the capital borrowed. It was short-sighted to conceal the dangers and responsibilities of this by calling such a debt "productive." Borrowed capital changed into stone and lime certainly remained an "asset," but whether the asset was worth much or little or nothing

depended on the value which future generations would put upon it. A tenement of houses, by change of circumstances, might lose its rent-producing capacity and call only for demolition long before it had suffered much deterioration as a building. In such circumstances the ideal kind of house would be one constructed to last, say, thirty years at the outside. But this, of course, was the last thing that municipalities in their present mood would think of doing, and they generally made it impossible by their own building regulations. Besides this, there was the consequence of the "economic trespass"; dwelling-houses for the poor generally took up the space of buildings of a more remunerative character, and so kept down the rateable value of the area while increasing its expenses. (2) The municipality entered into direct competition with many of its own rate-payers, competing not only with the comparatively small class of builders, but with the great class of owners of house property. Free competition of producers to serve the public was, of course, a good thing, and in nothing, perhaps, was it more desirable than in the purveying of houses, where the length of time required for erection tended to some extent towards monopoly. But competition was good because, and to the extent that, it kept down prices by increasing supply, and the action of a municipality working with money borrowed at a gilt-edged security rate was very likely to have the opposite effect; it might result in a positive diminution of the total supply of houses, and so a rise of rent, by reason of the discouragement given to private builders through the appearance of a rival with whom they could not compete on equal terms. (3) By pledging the public credit for a new debt, and adding a new activity and responsibility to already overworked members of the municipality, it *pro tanto* prevented the expansion of municipal activity in other directions. These were considerations against municipal building and owning derived from the general principles which should, in his opinion, regulate all municipal expansion. They were not, of course, decisive against it, but they suggested that very definite and weighty reasons must be put forward on the other side.

It was far too little realized that a sanitary and comfortable house among quiet neighbors had a "productive value," and was, quite definitely, one of the factors of wage-earning; in other words, a good house, as compared with a slum, brought with it the possibility of paying a higher rent for it. In view of the actual circumstances of slum life in every large city, and in view of the hopelessness of escape on the part of the low-paid wage-earner from contagious influences, there seemed *prima-facie* a strong case for the provision of at least one and two-roomed houses by an agency which would aim primarily at affording the tenants the conditions of health, morality, and efficiency, not only in the construction of the houses, but in their continued administration and control. He had always held that the owning of poor-class property carried with it a moral responsibility which was not escaped by the owner shutting his eyes and leaving the administration to his factor; and, on similar grounds, much might be said for a municipality owning and letting all the small houses within its area. This would at least secure a "clean city." Such a position, then, was quite intelligible as a counsel of perfection, and it might be worth consideration in the case of a city planned, like a garden city, from the beginning. But, in the actual circumstances of our cities, he mentioned it merely to bring out his point. For there was no proposal before any municipality of today of taking over and making a monopoly of the supply of small houses, or even of building all the small houses in the future. The utmost that had been proposed was the building and letting of a limited number of such houses in direct rivalry with private builders and owners. And the question which must be answered was, on what principle, or with what view, was this limited proposal made? If it were to afford an experiment and an object-lesson, as was done with the happiest results in the case of the corporation lodging-houses in Glasgow, where the rise in the standard not only swept out the old and very objectionable lodging-houses, but led to the large increase of private "models" competing successfully with the municipal ones, there would probably be nothing but approval. But if the proposal was made in the full recognition that such an experiment was not an object-lesson, inasmuch as it could not be followed by private enterprise; if the reason given for it was that a certain class of tenants could not pay the rent which private enterprise must have if it was to continue its supply, and that the municipality, as having command of capital at a very low rate of interest, could afford to undersell the market rents without coming on the rates, the matter was put on an entirely different basis. The attractiveness of

a "clean city" was one thing, the attractiveness of low rents another.

In the limited proposal now considered, what was being advocated was Government provision of a certain commodity for one class alone, and the ground taken undisguisedly was that Government could provide this commodity more cheaply than private enterprise could, and that this class could not afford more. There were two propositions here which could not be allowed to pass without examination; the first was that there was a class which could not afford the higher rent; the second, that this was a valid reason for the municipality providing them with a lower one. (1) Somewhat to the surprise of the Commissioners, it was given in evidence that, while wages generally had risen, there were laborers in Glasgow who were not earning more than 17s. a week—and these not casual laborers, but able-bodied men, in regular employment, and of ordinarily steady habits. To such a class 6d. a week was undoubtedly a serious consideration, and, although one might be inclined to ask if the 6d. could not, with great advantage to themselves and their families, be taken off the conventional necessities of drink and, perhaps, tobacco, the point need not be pressed. His reason for doubting if even this class "could not afford" 6d. a week extra for a house was that one of the causes, perhaps the principal one, why such men earned only 17s. was that they lived in conditions which lowered health and efficiency, and made them inefficient workers. He fully acknowledged that such people could not pay 6d. extra for the rent of a slum such as they were occupying, but he could not forget the "productive value" of the modern higher-rented house. It seemed to him that fresh air, and quiet sleep at nights, and surroundings which would react on the character and conduct of the person on whom so much depended—the wife—might easily add far more than 6d. to the earning power of the household. There was, unhappily, a class to whom this did not, directly at least, apply. There were thousands of workers whose wages were not 17s., but an average of 12s.—regular workers, and workers who could not take 6d. off their liquor and tobacco, for the reason that they neither drank nor smoked—he meant women workers. To these a good house would have a greater "productive value" than to men, for they were more subject to the illnesses and little ailments and depression which docked their wages by hours in the day and days in the month. So far as he could see, they were outside the housing question altogether, from the fact that they could not afford an independent house even at the lowest municipal rents. They must remain in the family as subsidiary wage-earners, or club together, or lodge. (2) But, assuming the very strongest case—that there was a class of unfortunate people who absolutely could not afford to pay 6d. a week more, he should still say that this in itself was no reason why the municipality should build. To supply them with houses under the market rate would be to introduce a new precedent and principle into Government industries which would lead us far. It would be using the credit of the entire body of the rate-payers to subsidize one small class of them; it would be, in essence, similar to the old legislation which kept down the price of bread when the harvest was bad, without the extenuation that such a measure kept down the price to everybody. It would be a rate in aid of wages. And if there was any lesson to be learned from the bitter experience of a century ago, it was that the evil of a rate-in-aid was, not so much that it punished those who had to subscribe to it, as that it punished those who received it, in that it effectually prevented wages from rising. Unfortunately there was in all large cities a class who, from physical and mental disqualifications, from want of education and technical opportunity, and from want of organization, must take very much the lowest wage which would keep them in life and moderate animal efficiency; and this class tended to be in over-supply from the fact that misfortune drained into it the failures of all the other classes. For a municipality to give these unfortunate people houses 6d. a week cheaper was to allow of them accepting 6d. a week less of wage than the circumstances would otherwise force the employer to give. As Mr. Booth said: "The poverty of the poor is mainly the result of the competition of the very poor." If, then, it became known that, in addition to the other attractions of a city, good houses at slum rents were assured to every one who was poor enough, it seemed inevitable that this would further tempt the influx of unskilled labor—and, unhappily, farm labor, skilled in its own fields, became unskilled when transferred to the streets and factories.

This, then, being the general argument against municipal building and owning of houses for the poorest classes, he went on to consider if there might not be circumstances in the evolution of a

city which might justify the relaxation of the principle. Glasgow again afforded an object-lesson. If the houses which were a danger to public health as hopelessly insanitary were pulled down; if "back lands" and obstructive buildings were demolished; if the houses which were by law pronounced "illegal" and could not from their structure and situation, be altered, were closed; and if the overcrowding laws were put sternly in force, something between 15,000 and 20,000 persons would be turned out, and would not be able to find houses at rents such as they were paying—for these measures would practically root out the low-rented houses in Glasgow. Many of the 15,000 or 20,000, no doubt, were well-paid wage-earners who would be the better of being forced into higher-rented houses; many of them, again, were dissolute and drunken persons who should be "hustled" from pillar to post till there was no room for them among honest people. But many of them, in all probability, were respectable persons who, from the causes already mentioned, had come down to the 17s. a week level. What are these people to do? Here he was chiefly impressed by two things. The first was that it was municipal inaction and municipal action which were responsible for the hardship. (a) It was by no fault of their own that the people to be dispossessed were in occupation of these low-class houses. The municipality for years allowed these houses to come into and remain in existence, and, to that extent, the municipality was responsible for the low standard of life which allowed the tenants to take the low wages. (b) It was to a great extent new municipal requirements that had made it impossible to build houses to be let at the old rents. To mention only a few of these—each adult must have 400 feet of air space, which meant larger apartments; there must be ample sanitary appliances, involving expensive plumber-work; there were provisions for thickness of walls and solidity of construction, which many builders declared quite unnecessary. The second was that, on its way towards conferring a great public benefit, this municipal action was likely to inflict serious hardship on a class who were least of all able to bear it. It was a recognized principle in the science of public finance that the charge of any general public benefit defrayed from rates and taxes should be spread over the citizens in proportion to their ability. In the present case we had a great beneficent measure of public health by which all the citizens would gain, and in quite indeterminate measure; and, although this was not defrayed from the rates, by parity of reasoning it seemed to follow that one class, and that the least able to bear the burden, should not be made to bear the heavy end of it. There was, besides, an opportunist argument. There seemed no doubt that the magistrates and responsible officials had hitherto shrunk from carrying out their powers because of the hardship that would be entailed. If this hardship could be avoided, there would remain no excuse and no reason for not proceeding vigorously with measures which otherwise might be somewhat extreme.

It was in consideration of these circumstances that the Glasgow Commission recommended the erection by the municipality, up to the extent of certain powers possessed by them under special Acts, of tenements of one and two-apartment houses, to be reserved exclusively for respectable people of the poorest class, preference being given to those dispossessed; such houses to be situated, if possible, near to the area of dispossession, and to be under carefully selected care-takers. It would be seen that the amount of building recommended was limited, the money which the municipality could spend under the Acts referred to being fixed and known. One would have liked, perhaps, that it should have been more rigorously limited. It would have been quite possible to take a rough census of the people dispossessed and build houses only to the number necessary to accommodate those who really suffered by the dispossession—the respectable poor at low wages. And what one would have liked, besides, was the clear laying down of the principle that this was an exceptional measure, due to an exceptional set of circumstances which could never occur again if the municipality lived up to the powers it had sought and obtained from Parliament. Insanitary and illegal houses should never again be allowed to come into existence. But, on the whole, the recommendation seemed a wise one. It escaped the chief objection, that of tempting an influx of new unskilled labor. It did not add to the supply of cheap houses, but merely filled the gaps which municipal action had itself caused. There was, indeed, he was afraid, a "loose end" in the result of the commission. To its subsequent regret, it was confined, by the limitations of its remit, to the consideration of housing within the city boundaries, and Greater Glasgow was growing more rapidly outside these boundaries. The problems of Glasgow grew up, he had said, because the city refused to look forward and lay

down the lines of its growth. Unhappily, that course was still forced upon it, in that it had no control over the operations of its suburbs. Everyone knew that, in the near future, Glasgow must extend its jurisdiction and responsibilities. There was too much reason to fear that, when that time came, the city would fall heir to the same problem as it had now to face—insanitary property and ill-planned districts. This was a problem of all growing cities, and, in his opinion, a most urgent one. But this was not the whole of Glasgow's answer to its housing problem. The municipal houses were to be reserved for the respectable poor. What about the non-respectable—probably the majority of those who would be dispossessed? So far as he could see, the criminal and the dissolute had no claim on the community, so far as regards housing. But there were many who were neither criminal nor hopelessly dissolute, and yet could not rise simply because they were down. They had lost their character; money could not buy them a decent house because they had no factor's line or other guaranty that they were fit for the possession of it. It was this class, perhaps, that would be most heavily hit by the dispossession, and for them also it seemed that some compensatory provision should be made by the municipality. And this seemed also in the interests of the community, for, if these people were not lifted up, they would be driven down. Hence the recommendation of the commission that "an experiment should be made in the erection of a building or buildings for those who, while unable to show any factor's line or other certificate, are willing to submit to necessary regulations as to cleanliness, respectable living, order, and punctual payment of rent, with the view of rehabilitating their character, and in time qualifying for a better house; such houses to be of the plainest construction, with indestructible fittings, and capable of being quickly and efficiently cleansed." It was avowedly an experiment. The difficulty was not to provide such houses, but to get the proper people to go into them. If any social obloquy was allowed to attach to these houses, the proper people would not go into them. But it was an experiment to which he thought everyone would wish God-speed. At any rate, it removed the last excuse for not going forward systematically, rigorously, and continuously with the renovation, closure, demolition, and prevention of overcrowding, which were the beginnings of any solution of the housing problem.

## BOOKS AND PAPERS

SOME time ago the publishers of *Zeitschrift für Innen-Decoration*, of Darmstadt, instituted a competition, the subject of which was a "house for an art-lover,"<sup>1</sup> and they have recently published as a portfolio of forty-odd large plates three of the designs submitted, most of the plates being printed in color. To say that the plates are interesting is to tell the truth, but they are interesting mainly because they are curious with not a little of the weirdness that belonged to Aubrey Beardsley's work in his particular field.

One of the designs is of German authorship, while the others are of Scotch parentage, and they present interesting racial variants of "l'Art Nouveau." The German example is less flamboyantly German than other designs by the devotees of the new cult, while the Scotch work is a very curious combining of the shrewd common sense of Scotch architectural designing with what may be called the transcendentalism or mysticism of the German followers of the new school.

We have always felt that the work of the best of the Scotch architects was a grade or two above the work of English architects of the same class, better reasoned and, in short, more architectural, and the work of the two Scotch designers here shown partakes to some degree of the national characteristics. The most interesting of the three is the design presented by Mr. Charles Rennie Mackintosh, who, with his brother-in-law, Mr. McNair, and their wives, formerly the Misses Macdonald, are the leaders of the "movement" in Glasgow, forming a group whose work has always attracted attention at various international exhibitions where they have exhibited.

This group is especially strong in the matter of interior decoration, and it is unfortunate that in illustration we could not reproduce some of the plates showing the interior treatment of the

<sup>1</sup> "Three Modern Land-houses." A work representing by 47 plates three country-seats in all their details. Designs by Baillie Scott, Bedford; Charles Rennie Mackintosh, Glasgow; Leopold Bauer, Vienna. Darmstadt, 1900. Alexander Koch, Publisher. Price 30 marks.



house, but as the charm lies largely in the color itself, it would be misleading to interpret the print in monochrome. As for the decorative forms used by the designer they are *sui generis*, wholly non-architectural, so far as historic precedent is concerned, but all rather based on the Japanese treatment of demoniac pipe-dreams; and yet there is a simplicity and rhythm which, combined with the low harmonies of the coloration, must produce a very simple and charming effect, to be noted with pleasure when you chance to see it in some other fellow's house during an afternoon's call, but which you question seriously whether you would like to live with daily for months and years. It is fanciful, capricious and not a little weird, but it is not cosy and comfortable. The treatment decoratively speaking goes admirably—and this perhaps the author would hold to be acknowledging that he has succeeded in what he aimed to accomplish—with the furniture designed for the use of the people who are to live amid these singular surroundings. But one cannot but believe that these high straight-backed chairs, made entirely out of flat boards, will, after a few weeks' use, be pushed up against the side wall of the dining-room, while less ascetic chairs than these—which would excellently serve for a barmecidal feast—take their places.

## ILLUSTRATIONS

[Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.]

HOUSE AT HAPSBURG, NORFOLK, ENG. MR. DETMAR BLOW, ARCHITECT:  
TWO PLATES.

WHEN we came to select for illustration some of the plates contained in the portfolio of designs which is considered elsewhere in

## Additional Illustrations in the International Edition.

### CHATEAU DE PAU, FRANCE.

WHOEVER has read the "*Heptameron*" cannot but have an interest in the Chateau de Pau, where Marguerite of Valois, "la perle des Valois," the sister of Francis I and wife of Henri d'Albret, King of Navarre, held her court. As the town is rather off the beaten track, the Chateau is not as familiar to architectural students as the chateaux of the Valley of the Loire, yet, as the illustrations show, it has attractions quite equal to the best work in the style found farther north. It was Marguerite, who shared with her brother Francis his admiration for the artists of the Italian Renaissance, who caused the essential reconstruction, about 1527, of the old mediæval castle which dated back to the tenth century, although it had been greatly enlarged during the last half of the fourteenth century.

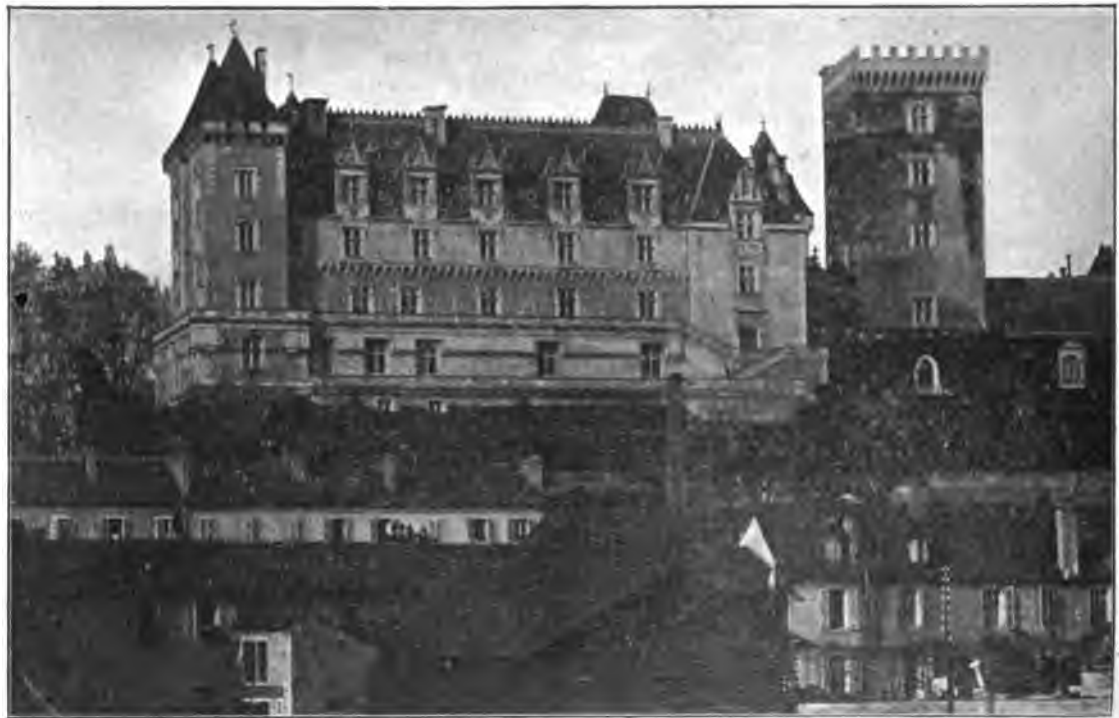
DOORWAY AND WINDOW: CHATEAU DE PAU.

THE COUR D'HONNEUR: CHATEAU DE PAU.

DORMER WINDOWS: CHATEAU DE PAU.

## NOTES AND CLIPPINGS

HEIGHT-TAKING BY BALLOON.—Several of the domes of that wonderful and fascinating place, the Mammoth Cave of Kentucky, have lately been measured by Dr. Horace C. Hovey, and the measurer has adopted an original means. Instead of ascertaining depths by sounding, he has estimated heights by the use of small balloons affixed to silk cords. These balloons were of



THE CHATEAU DE PAU.

this issue, we were struck with the similarity of lay-out between that selected by Mr. Baillie Scott and a scheme executed by Mr. Blow that recently appeared in the *Architectural Review* (London). Accordingly we looked up the matter in the files, and here reproduce the plates in question.

HOUSE FOR AN ART-LOVER. MR. C. R. MACKINTOSH, ARCHITECT.  
SEE reference elsewhere, under "Books and Papers."

HOUSE FOR AN ART-LOVER. MR. BAILLIE SCOTT, ARCHITECT.

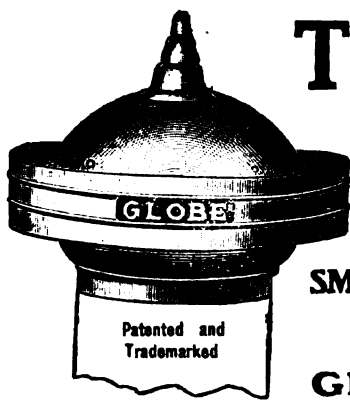
OLD HOUSE, DIJON, FRANCE.

THE CLOCK-TOWER: NOTRE DAME, DIJON, FRANCE.  
FOR description, see article elsewhere in this issue.

rubber inflated with hydrogen to a diameter of about 10 inches, and were used in groups of five. The operation was rendered the easier by illuminating the balloons as they ascended with strong acetylene lamps; and when it is added that one of the "domes" measured 154 feet from floor to ceiling, the interest of the experiment will be realized.—*Building News*.

PASQUINO IN LONDON.—It is amusing to know that posters used to be pasted up on the walls of St. James's Palace during the reigns of King George I and King George II, who invited criticism by their frequent stays at Hanover. The notices were to the effect that "George" had been "lost, strayed or stolen," that he had left his family "as a public charge," and intimated that a reward of 4s. 11½d. would be paid for his apprehension, since he was "not worth a crown."





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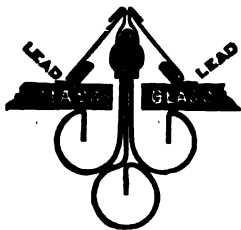
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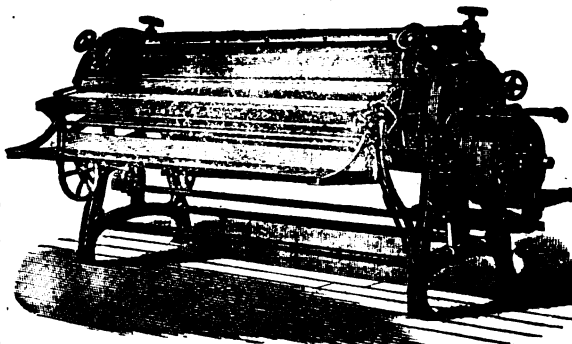
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